amateur radio

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EDITORIAL

☆

"BE PREPARED"

As we were completing the compilation of this issue the first authentic reports of the disastrous fires in Tasmania are coming through. It is known that many of the Amateurs are operating emergency communications, but so far we have no details to publish. We hope to be able to print the full story at an early date.

It is known that so far three of our members have lost everything they owned, and it is possible that others have also suffered heavy loss, but so far we have not been able to obtain the full picture.

In order to assist those Amateurs who have been affected, Federal Executive has asked that we publish the fact that they are accepting donations to assist our friends in Tasmania. At this time donations of money are requested, and depending on the response, later consideration will be given to the possibility of assisting with the replacement of equipment.

Having seen what devastation a major outbreak of fire can cause, it behoves all W.I.C.E.N. groups to adopt the Boy Scouts' motto—

"BE PREPARED"

K. E. PINCOTT, Editor.

CONTENTS

OVERTONE OPERATION OF QUARTZ CRYSTALS

PART ONE

D. H. RANKIN, VK3QV*

• Changes in techniques over the past decade have brought almost all of the experimentally inclined Amateurs into contact with the so called "overtone" crystal. This article describes the differences, and similarities, between fundamental and overtone units and indicates some pitfalls that may befall the unwary user. In addition, some questions are raised and answered that hitherto have not appeared in the Amateur literature.

TWO of the biggest changes in Amateur Radio techniques in the past ten years have been the advent of s.s.b. and the almost universal acceptance of crystal locked transmitters and receivers on the v.h.f. and u.h.f. bands. Both these advances have progressed with the help of the overtone crystal.

The early designs for v.h.f. crystal locked converters efficiently solved many of the serious problems of the day such as lack of frequency stability and accurately calibrated tuning dials, but in doing so a new problem arose. The usual approach was to use a cheap "disposals" crystal in the 2 to 10 Mc. range and multiply the frequency electronically until the requisite mixing frequency was obtained. The multitude of frequencies thus present in the converter invariably introduced spurious responses somewhere in the tuning range of the converter-receiver combination.

The advanced Amateurs soon found that starting the crystal multiplier chain with a high frequency rock minimised the problem. But then there were very few disposal crystals over 10 Mc. available and for several possible reasons—no doubt relatively high cost being one of the most important—the newer plated type units going up to 15 and 20 Mc. were never widely accepted by the fraternity.

Thus, experimentally inclined people looked into the possibility of making the fundamental 2 to 10 Mc. crystals work on an overtone mode, a method of operation for which these pressure mounted crystals were never designed. Operation was unreliable in most cases and the odd crystal that "overtoned" well was a cherished possession. In addition, the frequency obtained from an overtone circuit was a bit of a mystery. It was rarely, if ever, three or five times the marked frequency and it did not seem possible to "pull" the crystal in the way 7 or 8 Mc. ones could be. The circuits required had to be operated near the point of self oscillation—so near in fact that quite often equipment worked in a fashion without the crystal being plugged in at all.

This was not a very satisfactory state of affairs and some improvement came about when correctly designed overtone crystal units became readily available at reasonable prices. Problems still exist, however, but most would seem to stem from a lack of knowledge of how the modern plated overtone crystal should be treated. Very little has appeared in the Amateur literature on this subject and it is hoped that this article will go a little way into correcting this lack.

SOME THEORY AND DEFINITIONS

The simplified equivalent circuit of any quartz crystal is well known, particularly to those who experiment with crystal filters. Fig. 1A shows the generally accepted schematic with L_m being called the motional inductance (analogous to quartz mass), C_m the motional capacitance (analogous to elastic compliance), and R_m the series resistance (analogous to frictional loss). C_o is the static capacitance which is made up of the actual electrostatic capacitance of the quartz disc itself (parallel plate capacitor—see later) plus stray capacity associated with the crystal holder.

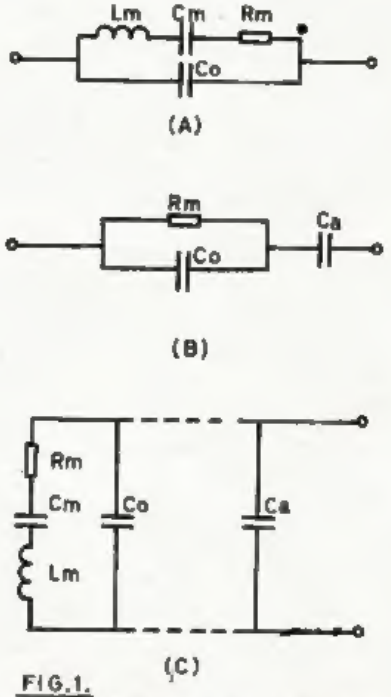

FIG.1.

Equivalent circuits of a Quartz Crystal.
(a) The general case.
(b) Series resonance case where XCo is greater than Rm, i.e. Co has no effect.
(c) Parallel resonance case.

Series Resonance is achieved at that frequency where the reactive values of L_m and C_m cancel, i.e.

$$f_s = \frac{1}{2\pi\sqrt{L_m \times C_m}} \quad \ldots\ldots (1)$$

where f_s is the series resonant frequency and L_m and C_m are as defined previously.

Fig. 1B shows this condition in circuit form and it can be seen that the crystal now looks like a resistor of value R_m shunted with capacity C_o. If C_a is some value of capacitance added in series to the circuit then the **equivalent series resistance** (e.s.r.) of the crystal is given by the expression

$$\text{e.s.r.} = R_m \left\{\frac{1 + C_o}{C_a}\right\}^2 \quad \ldots\ldots (2)$$

If C_a is removed, the expression becomes

$$\text{e.s.r.} = R_m \quad \ldots\ldots (3)$$

Note that the e.s.r. is **not** dependent on the static capacity across the crystal (C_o) and in fact is not dependent on added shunt capacity either when operated in a series resonant configuration. This fact is important and will come up later in the discussion on overtone circuits. For good overtone crystals the e.s.r. is low, 60 ohms or less, and the lower this value the better is the crystal.

The series resonant frequency of a crystal, f_s, is also known as the zero.

Parallel Resonance. There is a second frequency at which a crystal unit will behave as a pure resistance and that is the frequency at which the reactive values of L_m and C_m plus C_o in series cancel. This parallel or anti-resonant frequency is given by the expression

$$f_p = \frac{1}{2\pi\sqrt{L_m \times C_t}} \quad \ldots\ldots (4)$$

where f_p is the anti-resonant frequency

$$\text{and } C_t = \frac{C_m \times C_o}{C_m + C_o} \quad \ldots\ldots (5)$$

L_m is as stated previously.

Fig. 1C illustrates the situation and the figure of merit in this case is called the **equivalent parallel resistance** (e.p.r.) and is given by the expression

$$\text{e.p.r.} = \frac{1}{\omega_p^2 (C_o + C_a)^2 R_m} \quad (6)$$

where $\omega_p = 2\pi f_p$ and C_m, C_a and R_m are as defined previously.

Note that in this case the added external capacitor C_a is shunted across

DAVID RANKIN, VK3QV

Has held an Amateur licence for 12 years—the first four as a limited licensee. Served on F.E. for nearly eight years, initially as Federal V.h.f. Manager, but latterly as Federal Activities Officer. This position entails responsibility for co-ordination and liaison between the Federal Executive and various co-opted officers such as Federal Contest Manager, Awards Manager, Y.R.S. Co-ordinator, etc. The Federal Activities Officer also collates and holds the official file on Australian V.h.f. Records.

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C_n and together with C_o forms C_t the load capacitance. Then C_s in equation (5) would be replaced by C_t.

If C_s is removed equation (6) simplifies to

$$\text{e.p.r.} = \frac{1}{\omega_p^2 \, C_o^2 \, R_m} \quad \ldots \ldots \quad (7)$$

Note that the e.p.r. is dependent on both frequency (ω_p) and C_o, whereas e.s.r. in the series resonance case was independent of frequency and static capacitance (refer equation 3).

Thus for parallel resonant operation it becomes necessary to specify the external shunt capacity C_t when nominating the required frequency. The e.p.r. of an overtone crystal is much higher than the corresponding e.s.r.—of the order of several hundred ohms and the higher the e.p.r. the better the crystal.

The parallel or anti-resonant frequency of a crystal, f_p, is also known as the pole.

POLE-ZERO SPACING

Fig. 2 shows a plot of reactance versus frequency based on the equivalent circuit in Fig. 1A and it summarises the above points. Note that at frequencies below fs, the crystal behaves as a capacitance as it does also for frequencies above f_p. Between fs and f_p, however, the crystal unit behaves as an inductance whilst at fs and f_p it becomes a pure resistance—very low at fs and very high at f_p. In the ideal case (no frictional loss) the e.s.r. would be zero (refer equations 2 and 3) and the e.p.r. would be infinitely high (refer equation 6). Normal operation of any crystal is at fs or between fs and f_p and the recommended operation for overtone units is fs. This segment of the frequency spectrum, f_p — fs, over which a crystal can be made to oscillate, is known as the pole-zero spacing.

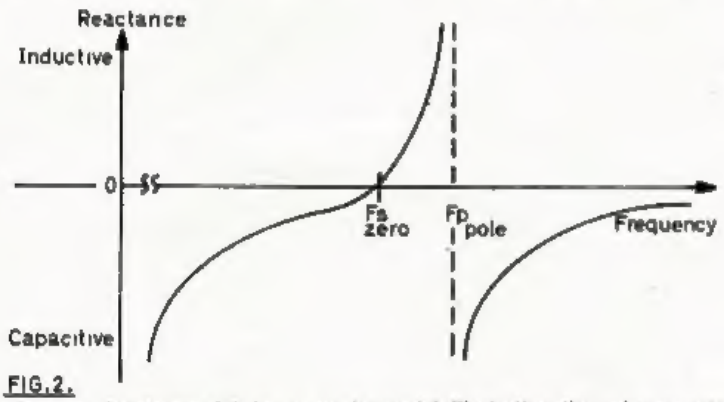


FIG.2.

A reactance v. frequency plot for a quartz crystal illustrating the pole-zero spacing.

OVERTONE OPERATION

Most of the crystal types encountered by Radio Amateurs possess more than one mode of vibration. However, discussion here will be confined to the types generating frequency in the h.f. and v.h.f. spectrum and in particular to the AT and BT cut types that vibrate in the thickness shear mode. The older h.f. X and Y cuts are now obsolete and not considered. Further details of the AT and BT cut quartz plates may be found in the references given in the bibliography. Suffice to say here that these types are chosen because of their superior temperature-frequency performance. The AT cut is the better of the two and has a temperature coefficient approximating 0.5 cycle/Mc./°C over the useful temperature range 0 to 70°C. Thus of the h.f. overtone crystals manufactured today, the very large proportion will be AT cut.

Mode of Vibration

The way in which an AT or BT cut quartz plate vibrates when excited at its fundamental frequency is shown in Fig. 3A. The frequency of vibration is primarily determined by the thickness of the quartz plate or disc, but is also affected by any substance that increases the mass of the vibrating body—a substance such as lead pencil, soft solder, pure silver or pure gold.

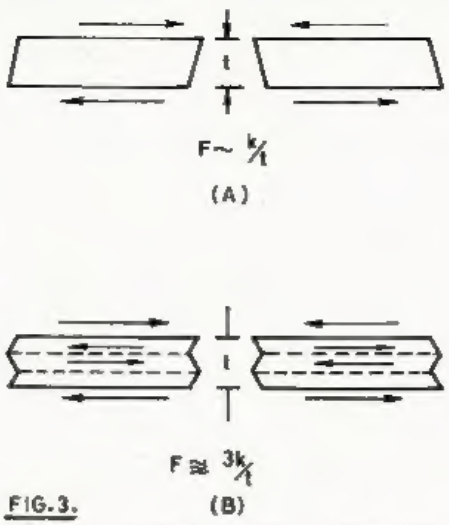


FIG.3.

Diagrams showing in cross section the deformation of a quartz crystal. Fundamental mode is shown at A, and third overtone mode at B. K is a constant of proportionality.

If the same quartz plate is excited at approximately three times its fundamental frequency it will vibrate in the manner illustrated in Fig. 3B. Note that the quartz now behaves as if it consists of three distinct layers. Such operation is called the third overtone mode. Similarly, if the plate is excited at five times, seven times, nine times, etc., the fundamental frequency, then the quartz "splits" into 5, 7, 9, etc., layers and fifth, seventh, ninth, etc., overtone operation is obtained. It is important to note that only odd order overtones can be excited with the conventionally mounted AT cut crystal.

For crystals operating in the overtone mode the frequency is approximately proportional to one-third the thickness of the plate for thirds, one-fifth the thickness for fifths, one-seventh the thickness for sevenths, and so on, and once again mass loading has a secondary effect. More of this approximate relationship in a moment.

If the electrical characteristics of the crystal plate at its various overtone frequencies are examined closely it will be found that the reactance v. frequency relationship will be the same as that shown in Fig. 2 for fundamental operation. Thus, the spectrum of an AT cut crystal will look something like that shown in Fig. 4, i.e. there will be a pole-zero spacing associated with each mode of vibration. Anyone for a crystal filter at 100 Mc. made from fifth overtone crystals?

It is of interest to note the values of fs and f_p at the fundamental, third and fifth overtones of a particular crystal unit.

f_p	3395.22	10155.84	16876.70
fs	3387.39	10155.34	16876.38
f_p-fs	7.83	0.50	0.32

Note that the pole-zero spacing at the overtones is very much smaller than at the fundamental. Thus the overtone frequency is harder to pull—but, it isn't impossible.

The Overtone Frequency

One of the mysteries associated with overtone operation was "what will the output frequency be?" There are two reasons for this well known problem and the principal reason is a real problem to the crystal manufacturers.

As stated in the previous section, the relationship between the overtone fre-

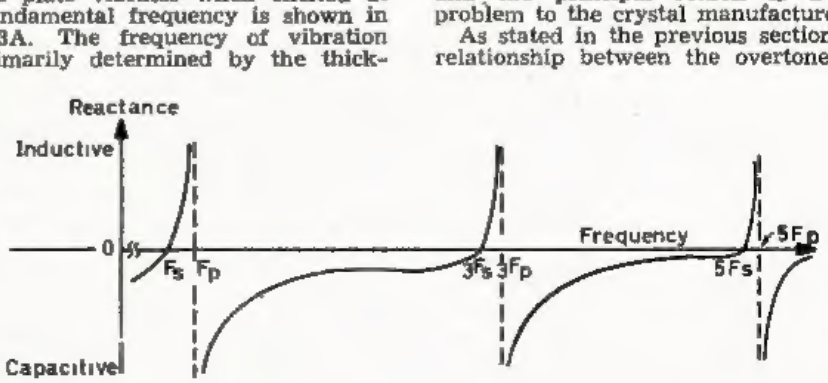


FIG.4.

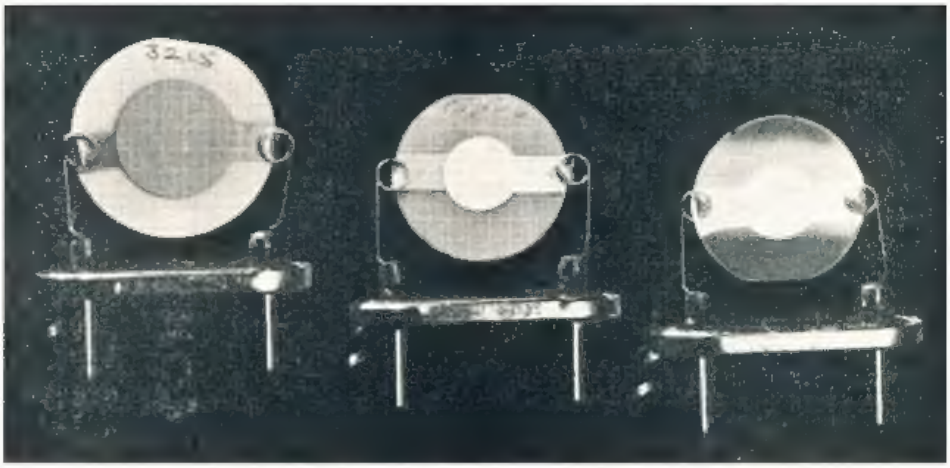
A reactance v. frequency plot illustrating the poles and zeros at the fundamental mode, third overtone and fifth overtone modes.

quency and the thickness of the quartz plate is very approximate. So much so that in practice no attempt is made to correlate thickness and overtone frequency precisely. The manufacturer in fact gets around the problem by ignoring it—**overtone crystals are always finally calibrated at the overtone frequency for which they are intended.** Thus, the problem of what is the frequency is minimised when a crystal designed and calibrated for the particular overtone required is used.

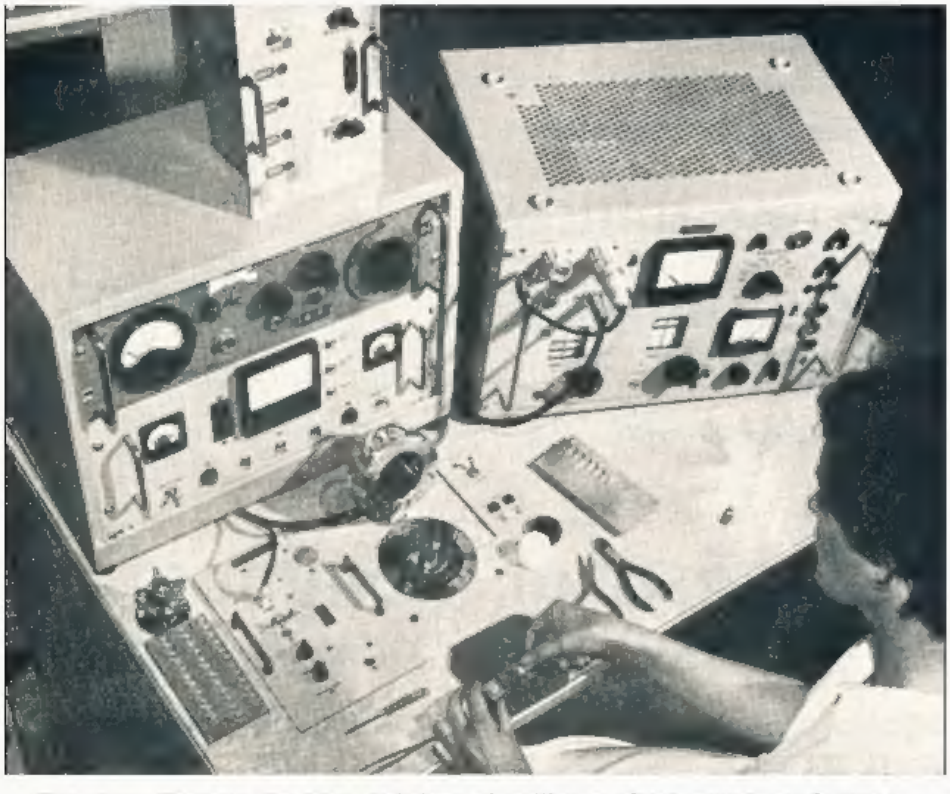
The reason for the approximation between overtone frequency and thickness seems to be associated with the degree of uniformity of thickness or flatness across the quartz plate. In a perfectly uniform or optically flat disc the relationship would be exact, but since with present techniques the manufacturer cannot achieve this economically he must oscillate the crystal on its required overtone and measure the actual overtone frequency. This is expensive as special oscillators and frequency measuring equipment with extended ranges must be used.

The secondary reason for the uncertainty of the frequency of an overtone crystal is associated with the existence of a pole-zero spacing at the overtone and as already described the crystal may be made to oscillate on any frequency between its pole and zero. Thus once again it becomes necessary to specify the operating point between f_s and f_p if precise frequency is to be obtained. This reason is only secondary because the difference in frequency due to either inaccurate or lack of specification will be of the order of a few kilocycles at overtone frequency.

Quite frequently this is no worry in Amateur operation. On the other hand the difference between three times fundamental frequency and the third overtone frequency can be as much as 70 kc. For example, one crystal when operated on fundamental series resonance came out as 17549.25 kc. and when oscillated at third overtone series resonance as 52708.57 kc.—a difference of 60.8 kc. This deviation becomes greater the lower the frequency until with plated fundamental crystals of approximately 6 Mc. and under it becomes very difficult to achieve overtone operation at all. Interested readers may care to work out the arithmetic involved with the deviation for the example of the 3.3 Mc. crystal given earlier.



The mounted but uncanned crystals are, from left to right, a 3.3 Mc. fundamental gold plated, a 52.4 Mc. third overtone silver plated, and a 75.0 Mc. polished fifth overtone silver plated. Note the variation of polish on the quartz blanks and the "keyhole" shape of the electrodes.



This photo illustrates the latest technique of putting a plated crystal on frequency.

The frequency synthesiser on the right of the operator is set up to the required frequency. The crystal to be processed is suitably masked and placed in the chamber immediately in front of the operator. The photo shows the operator fitting a crystal unit into the masking device. When the chamber lid is closed the air within the chamber is evacuated and gold or silver is evaporated onto the crystal in a controlled manner. The added mass of gold or silver will lower the crystal frequency.

The horizontal panel to the left of the operator is a special oscillator that is connected to the crystal within the chamber. The output of this oscillator is fed to the synthesiser, mixed with the synthesiser frequency and the difference frequency displayed on the larger meter on the synthesiser panel. As the gold or silver evaporates the decrease in frequency is indicated on this meter and the operator can place the crystal frequency within 0.001% of that required.

It should be noted now that operation on the third overtone is quite different to using the third harmonic of the fundamental frequency. The crystal plate vibrates in quite a different manner so that no r.f. energy is produced at a frequency lower than the overtone. Thus with a 42 Mc. third overtone crystal operating correctly there will not be any r.f. produced at either 14 or 28 Mc. However, there will be harmonics of the overtone at 84 and 126 Mc., but these are produced by the non linear operation of the oscillator valve or transistor in the same way as second or third harmonic frequency is produced in fundamental style oscillators. Herewith lies the prime advantage of the overtone crystal.

If the 42 Mc. unit is oscillated at its fundamental of approx. 14 Mc. there will be r.f. energy at 14, 28, 42, 56, 70 Mc., whereas if it operates at 42 Mc. r.f. energy will be present only on 42, 84, 126, 168, 210 Mc., etc. The chance of having a "birdie" in a crystal locked converter—tunable receiver combination is thus very much less with the overtone style of operation.

Construction of an Overtone Crystal

What then are the physical differences between an overtone and a fundamental crystal? Why do overtones work better in overtone mode than the other types?

There are a number of differences and one has already been mentioned, viz. the calibration of the overtone at the actual overtone frequency. A sec-

(Continued on Page 19)

THE IMPEDANCE METER

PETER D. WILLIAMS, VK3IZ*

ALTHOUGH the principle is not new, impedance measurements with the simple device described can take the doubt out of transformer ratios, filter choke impedances, and electrolytic capacitors.

Impedance measurement is accomplished by comparing the voltage drop across the unknown impedance with the voltage drop across a resistive standard when the same current is flowing in both of these circuit elements. The circuit is shown in Fig. 1 and the constant current resistor is approximately 100 times the standard.

To make measurements an audio frequency oscillator is required, preferably with an output impedance of 1000 ohms or less as the voltage source, together with a v.t.v.m. of good sensitivity and accuracy.

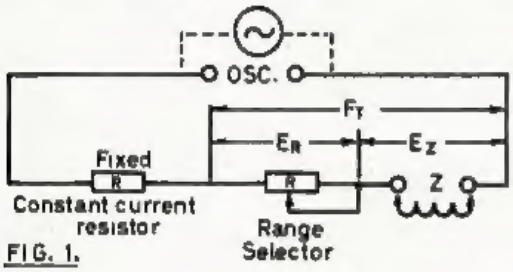


FIG. 1.

CONSTRUCTION AND PROCEDURE

The construction is entirely one of personal preference, the only precaution is to use shielded cable for the leads shown. It should also be noted that a physical "ground" as such is not provided and the terminals marked "LO" should be connected to the ground terminals of the oscillator and voltmeter. However, when measuring an unknown, which is isolated from ground, the "LO" v.t.v.m. terminal should be grounded. If the unknown is not isolated from ground, no other ground connection should be used.

When measuring high impedances, a cathode follower amplifier should be connected between the impedance meter and the v.t.v.m., otherwise the shunting impedance of the v.t.v.m. must be taken into account. For example, the input impedance of a Heath v.t.v.m. is 1 megohm.

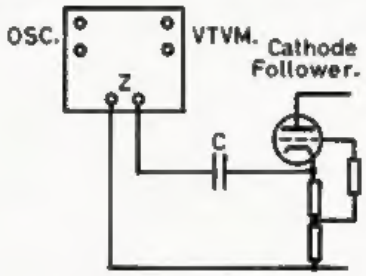
Having connected the v.t.v.m. and oscillator to the appropriate terminals, the impedance to be measured can be connected across the terminals marked "Z." The "R-Z" switch will measure the voltages shown in Fig. 1, viz. E_R, E_Z. Then—

Set the range selector switch at the value nearest the estimated value of the unknown impedance.

With the "R-Z" switch at "R", adjust the output control of the oscillator until a convenient reading such as 1, 0.1, or other power of 10 is obtained on the v.t.v.m.; this voltage is E_R.

Turn the "R-Z" switch to the "Z" position and read the v.t.v.m. This voltage is E_Z and is proportional to the impedance of the unkown. For example, if the initial voltage setting in step 2 above was 1 volt, the unknown impedance equals the reading of the v.t.v.m. times the resistance of the standard (i.e the setting of the decade or range selector switch).

If the initial voltage setting was 10 volts, the unknown is one-tenth as much. Thus if the decade switch is set to 100 and the v.t.v.m. made to read 1 with "R-Z" switch in the "R" position, and if it reads 2.38 when switched to the "Z" position, the unknown has an impedance of 238 ohms. If the meter had initially been set at 10 however, the unknown would be 23.8 ohms.



USING THE METER

To make this clear let us consider ways in which the instrument can be used.

RESISTANCE MEASUREMENT

With the oscillator and v.t.v.m. connected as described earlier, connect the resistor which is the unknown to the "Z" terminals. Suppose the resistor is marked 680 ohms, then set the standard resistor decade switch at 1K and set the oscillator at the frequency at which it is desired to make the measurement—say 100 cycles.

With the switch "R-Z" in the "R" position, turn the output control of the oscillator until the v.t.v.m. reads some convenient value such as 0.1 or some other power of 10. Then turn the "R-Z" switch to the "Z" position and the v.t.v.m. will indicate the actual impedance of the unknown.

Thus if the meter reading drops from 0.1 to 0.071, the actual value of the resistor is 710 ohms or 5% higher than its rated value.

It is evident that the meter may also be used as a direct reading resistance device by substituting a d.c. source for the oscillator and either a v.t.v.m. or standard type meter. How-

(Continued on Page 11)

PETER WILLIAMS, VK3IZ

Federal Secretary, has been licensed under this call since 1950 and was a member of the Institute prior to obtaining the call VK3IZ. Until coming to Melbourne seven years ago, Peter operated from country areas of Victoria, being at that time a member of the teaching profession. Currently he is manager of an American electronics subsidiary. Institute activities have included the secretaryship of the Victorian Division until his promotion(?) to Federal Secretary in 1965. Amateur Radio interests are broad but confesses a preference for constructing rather than operating. Current projects include a high resolution spectroscan, a new receiver, and sorting out the intricacies of r.t.t.y. machines—and Federal affairs.

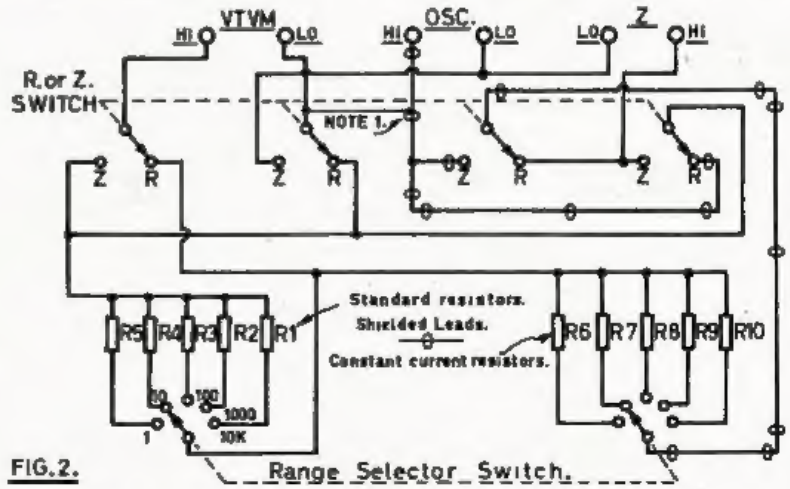


FIG. 2.

Note 1.—Connection to braid as shown. Join all braids.

Resistors Carbon.

R1— 10K	½ w.	plus and minus	1%
R2— 1K	"	"	" "
R3—100K	"	"	" "
R4— 10 ohms	½ w.	plus and minus	1 %
R5— 1 ohm	"	"	" "
R6—100 ohms	4 w.	5 %	
R7— 1K	1 w.	5 %	
R8— 10K	½ w.	5 %	
R9—100K	½ w.	5 %	
R10— 1M	½ w.	5 %	

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A TRANSISTORISED 80 METRE RECEIVER

HAROLD L. HEPBURN, VK3AFQ*

FOLLOWING the articles on the Moorabbin Club Project Receiver which appeared in "A.R." towards the end of last year some comment on the finished receivers is in order.

The first section deals with the general method of testing while the second section covers some of the problems encountered and how they were overcome. In addition, some possible modifications and improvements are suggested.

TESTING THE FINISHED RECEIVER

Since those taking part in the project had, in the main, constructed and tested one stage at a time, the first four stages (audio, b.f.o., i.f. and local oscillator) were operative and roughly lined up before the final stage was constructed. Readers who have followed this series of articles and who have attempted construction along the lines suggested herein will no doubt have done something similar. On completion of the r.f./mixer stage, then, it remains only to wire all the boards together and complete the alignment process.

With the r.f. and audio gain controls at minimum, the total current drawn by the completed receiver should be about 20 mA. at 12 volts. Minor variations may be encountered and are unimportant but gross variations, especially on the high current side, should be investigated before going further. Since it is assumed that the first four stages were operating correctly, the r.f./mixer board and the interconnections would be the first point to check.

The i.f. stages and the b.f.o. are then re-aligned. With audio and r.f. gains at mid travel and the b.f.o. switched off, a signal of about 100 mV. at 455 Kc. is fed to the collector of the AF117N mixer through a small (say 25 pF.) capacitor.

A standard signal generator can, of course, be used but the writer used a small, transistorised, crystal oscillator for this phase of the alignment.

A 20,000 o.p.v. multimeter, set to its 10v. range, is connected between the a.v.c. line and ground to act as an alignment indicator.

Starting with L4, all six i.f. transformers are adjusted for the **minimum** reading on the multimeter. The input from the signal source will need to be reduced as alignment proceeds.

With the i.f. stages on frequency (and the 455 Kc. signal still being injected), the b.f.o. note condenser is set to mid travel and the b.f.o. switched on. The core of L1 is then adjusted to give zero beat with the injected signal.

To align the front end the b.f.o. is switched off, the r.f./mixer gang set at full capacity and the local oscillator tuning condenser set about 5% open (i.e. at about 95 on a 0-100 scale).

A modulated signal of about 100 microvolts at a frequency of 3.50 Mc. is then fed into the antenna terminal. The core of L8 (the local oscillator tank coil) is then adjusted for minimum reading on the multimeter. The cores of L11 and L12 are adjusted to give the greatest dip in multimeter reading, once again reducing the signal level as alignment proceeds.

Alignment is then checked at 4.0 Mc. and, if correctly wound, L11 and L12 should not require any adjustment, while a peak in signal strength should be obtained just before minimum capacity on the preselector gang.

The b.f.o. amplifier output coil (L2) may now be adjusted.

Feed a strong modulated a.m. signal to the receiver and adjust to zero beat with the b.f.o. on. With the b.f.o. still on, detune the b.f.o. oscillator coil (L1) slug until the beat note is inaudible. At this stage the audio output from the speaker should have dropped considerably. Adjust the core of L2 until audio output drops to a very low level or nulls out completely. Finally bring the core of L1 back to its original position, i.e. into zero beat with the incoming carrier.

The receiver is now fully aligned and may be connected to an antenna.

MODIFICATIONS AND IMPROVEMENTS

Audio Stage

Two participants, using the basic audio board, have increased the audio output to just under 1 watt in the following manner:

(a) The TO3 output transformer was replaced with a TO7 component and the 15 ohm secondary tapping used to drive the 15 ohm speaker provided with the kit.

(b) The upper base bias resistor for the two output transistors (AC128) was reduced from 4700 ohms to 1500 ohms and the bottom base bias resistor was reduced from 100 ohms to 33 ohms. The common emitter resistor was reduced from 22 ohms to 4.7 ohms.

This modification is given "as is" although it is felt that heat sinking of the AC128s and the use of a thermistor in the base bias circuit would be necessary for safe working under adverse temperature conditions.

B.f.o. Stage

It has been found in many cases that the b.f.o. oscillator has been grossly overdriving the b.f.o. amplifier. This has caused the generation of very strong harmonics, the 8th harmonic on 3640 kc. being extremely troublesome. In addition, the b.f.o. note was very rough and precluded proper reception of s.s.b. signals.

Both the overdriving and the need for the harmonic trap can be obviated by reducing the feed voltage to the b.f.o. oscillator (but **not** the b.f.o. amplifier) to between 1½ and 2 volts.

This can be done by fitting a resistor under the board. Its value will best be found by experiment but will be somewhere between 27K and 39K.

Be sure that the resistor only drops the voltage applied to the oscillator collector and base connections and not to the amplifier base and collector. The amplifier should continue to be fed at —7½ volts.

In one case at least, an improvement in sideband reception was reported when the method of coupling the b.f.o. to the product detector was changed. As designed, b.f.o. voltage is fed from the output link of the b.f.o. amplifier coil in series with the detector emitter. Grounding the emitter direct and capacity coupling the output link through a 50 pF. condenser to the base of the detector (OC44N) transistor is claimed to give better results.

The I.F. Stage

A fairly large number of cases of poor i.f. stage performance were encountered. In every case the winding of the coils was found to be the reason. In some cases improper tapping points had been made, with the result that the collectors of the i.f. amplifiers were grossly mismatched in the direction of greater gain and thus instability. In a few cases the "neck" of the ferrite coil former had been broken off and in other cases poor soldering of the winding wire terminations had caused problems.

With proper attention paid to the winding of the coils most i.f. strips performed as intended, but in one or two receivers the stage could be made to oscillate when incorporated in the finished set.

Poor dressing of the supply leads to the various boards or higher than

HAROLD L. HEPBURN, VK3AFQ

Licensed since 1960, Harold has been active in many phases of Institute activity. He served on the VK3 Broadcast Committee for three years and for a similar length of time on the VK3 Divisional Council. He has been State Controller for the VK3 W.I.C.E.N. organisation for over four years and has been Federal Vice-President since 1965. He is also the Secretary of the Moorabbin and District Radio Club.

Born in England, Harold settled in Australia in 1956 after a seven-year period of (working) travel which took him to many countries including Iran, France and New Zealand. A chemist by profession, he has been engaged for many years on the production and administrative sides of various technical enterprises including oil refinery, heavy chemical manufacture and plastics.

He has written several articles for "A.R.," the most recent being this series on the Moorabbin Club project receiver.

* 4 Elizabeth St., East Brighton, Vic.

normal gain have been the main causes, but stagger tuning of the six i.f. transformers (L4, L5, L6, L7, L9 and L10) will reduce the tendency. A 2 kc. "stagger" is quite sufficient.

In the most stubborn cases a low value resistor (100-1000 ohms) across the input terminals of the i.f. board is a certain cure. Use the largest possible resistor. Note that the tuning of L9 will be affected and its tuning will be very broad when a resistor is used across the i.f. input.

In one case it was found that L9 would not peak even with the core right in. Rather than rewind the coil, an additional 50 pF. was placed across the existing 270 pF. capacitor associated with L9.

The optional S meter circuitry given in the r.f. stage instruction calls for a 0-1 mA. meter to be connected between the "cold" end of the 10K load resistor in the collector of the OC72 a.g.c. amplifier and the —7.5 volt line.

In general the meter "saturates at somewhere between 0.4 and 0.6 mA., similar to the bridge circuits used in valve receivers.

If a greater saturation level is required (so that an S9 signal reads S9 on the meter recommended and a **very** strong signal reads over S9) it can be achieved by reducing the value of the 10K load resistor.

As a starting point for experiment, reduction of this resistor from 10K to 6.8K will provide about the right result. There is no need to remove the i.f. board to do this. The 10K resistor is left in place and paralleled with, say, a 22K resistor to reduce its value.

This modification does not affect the a.g.c. action.

There are some grounds for believing that the r.f. volume control could be more effective. Replacement of the 500K switch pot. provided with a 50K component is the first step.

The original points on the board to which the r.f. volume control was taken are bridged across. The cold end of the 82K base bias resistor for the OC72 is thus connected permanently to the —7.5 volt line.

The 47K base bias resistor for the first AF115N amplifier is now removed and replaced by the 50K pot. One end of the pot is taken to the "cold" end of the input link. The other end and the slider are connected together and taken to ground.

Local Oscillator Stage

When testing local oscillator boards at a project meeting it was immediately apparent that severe frequency drift was being encountered. The fault was not, as opined by one club member, due to the use of drift transistors, but rather to the 0.01/25v. redcap condenser used to decouple the cold end of the oscillator coil to ground.

On Fig. 14 of the instructions the offending component is the one placed at an angle between the lower end of the r.f. choke and the +7.5 volt input point.

Replacement of this condenser with an 0.022/200v. styroseal component cured the trouble. The actual value of the condenser is not of prime importance as anywhere between 0.01 and 0.05 will be suitable. The important point about the replacement is that it be suitable for the service. It is recommended that either silver mica or styroseal be used. Styros work and they are cheaper!

When development work was being carried out on a 2 metre converter for use with the project receiver, it was found that the local oscillator of the receiver was producing a large number of "birdies".

Further work with a signal generator showed that—like the b.f.o. oscillator—the local oscillator was producing a rich crop of harmonics. Once again the cure was to reduce the feed voltage to between 1½ and 2 volts.

A resistor between the negative tie post on the i.f. board and the local oscillator board can be used to drop the voltage to the required value. A resistor around 39K is a good starting point. It is of interest to note that the stage will oscillate at voltages down to —1.0 volt.

In a few of the local oscillator boards it was found that a sudden jump in collector current occurred at about half capacity of the tuning gang. The reason for this is not clear, but was cured by reducing the feed voltage as recommended in above paragraphs to 1½ to 2 volts.

R.F./Mixer Stage

Some constructors have experienced difficulty in getting the preselector gang to peak at each end of its travel.

Providing always that the coils have been correctly wound the cause usually lies with the two 100 pF. condensers in series with the tuning gang being at the low end of their tolerance range. The addition of an extra 100 pF. across each of these two condensers will enable a peak to be obtained at 3.5 and 4.0 Mc.

Alternatively the two 100 pF. condensers can be bridged across. This will mean the two gang condenser will now tune over the image frequencies so that care must be exercised in choose the correct position.

Broadcast break through was experienced in one case where a large non resonant antenna was used. Over two volts of assorted broadcast r.f. was measured at the end of the antenna. This was causing the protective OA91 diodes to conduct and generate a nice selection of harmonics. Where it is not possible to use a resonant antenna (or a suitable antenna tuning unit) the only cure is to use a small antenna.

One constructor has fitted a small mechanical filter in place of L9 and L10. Input to the filter was taken from the collector of the AF117N mixer and the end of the 1K decoupling resistor. Output was taken directly to the input of the i.f. board. The filter used in this instance was a 6 kc. Toyo unit using small input and output transformers. Suitable matching terminations would have to be made if the Collins or Koksuai filters were used.

General

One participant has modified the tuning range of his receiver to cover 2 Mc.

While no change was made to the coils on either the oscillator or r.f. boards, the values of most of the fixed tuning capacitors were drastically changed.

As an indication it is possible to reduce the 470 pF. silver mica on the oscillator board as far as 150 pF. and still maintain oscillation.

Removal of the 220 pF. silver mica series condenser on the oscillator board will widen its tuning range.

To keep "track" the series condensers on the r.f. board can be bridged out and the parallel capacities reduced in value.

No firm values will be given for this modification since the receiver was not designed with such a wide coverage in mind. The possibility is mentioned only to show that it can be done if the would-be modifier is prepared to do some experimenting.

SINGLE SIDEBAND ON V.H.F.

KEVIN CONNELLY, VK3ARD*

ONE of the aspects that becomes obvious in being involved in the various matters before F.E. is the threat to our band allocations unless we make more use of them. This is just as true on the v.h.f. bands as on the h.f. Just look at the congestion on the commercial channels a little higher in frequency than our 2 metre allocation and you can see where one threat could come from.

So what can be done to put more stations into this band for instance? Well, now that there is a tremendous increase in the amount of s.s.b. gear being used on the h.f. bands, this presents all these "d.c. band" types with an excellent starting point for getting on to 2 metres—with s.s.b., a.m. or c.w.—just as they do on 14 Mc. These notes are intended to show just how simple it is.

Apart from the h.f. s.s.b. rig you need (1) a receiving converter and (2) a transmitting converter. Let's look at each one in turn.

RECEIVING CONVERTER

I feel that there are a lot of chaps who, like me, were left with a receiving converter and an old a.m. 2 mx transmitter (complete with some t.v.i. too, because of a crystal chain frequency that included 48 Mc. one way or another). So I scrapped the Tx and just connected the receiving converter into my Drake s.s.b. Rx at 7.5 Mc. using two of the spare band positions provided (each tunes a 600 Kc. segment) and thus I can have 144-145.2 Mc., which is more than the normally used section of the band, leaving out the f.m. nets.

If you don't have a 2 metre converter there is a very simple crystal controlled converter described in the A.R.R.L. Handbook (also in the V.h.f. Handbook). This gives an output on 14 Mc.—what more do you want?—and these are really easy to get going. The hard work has gone out of these converters now with the amount of constructional detail provided.

TRANSMITTING CONVERTER

The information available on the transmitting converter is not so widespread. I built a similar one to that described in the V.h.f. Handbook and because I have found that many chaps are put off by believing that, like other s.s.b. gear, it is difficult to build, the unit is described to show that it is indeed very simple to construct as an adjunct to your h.f. s.s.b. Tx.

From the block diagram it can be seen to consist of five stages:— (1) an overtone crystal oscillator using a crystal to give an output on 43.333 Mc. using the triode section of a 6BL8; (2) a tripler to 130 Mc. using the pentode section of the 6BL8; (3) a buffer stage on 130 Mc. using a 6AK5 to isolate the oscillator from the s.s.b. mixer, (4) a mixer for the 130 Mc., into the cathode of the QQVO3/12 with the 14 Mc. s.s.b. from the h.f. rig into the two grids; (5) a driver for the 144 Mc s.s.b. output; (6) an AB1 class amplifier.

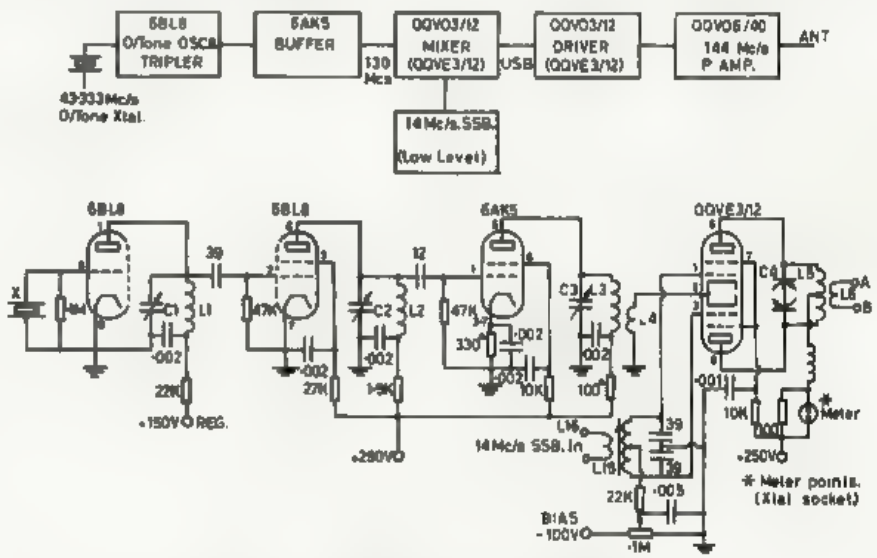
GENERAL NOTES

Several things worth noting are:—

(a) The 14 Mc input from the h.f. rig is only "flea power," less than ½ watt, and is best taken from the driver stage. A 10 pF. capacitor to the plate of this driver is all that is required and connect this to a co-ax. socket for convenience.

This connection, plus a means of disabling the 14 Mc. output stage (a switch in the filament supply, screen

(Continued on Page 11)



L1 —7 turns No. 22 ½ in. diam. ¾ in. long.
L2 —6 turns No. 20 9/32 in. diam. ⅜ in. long.
L3 —6 turns No. 20 9/32 in. diam. ⅜ in. long.
L4 —1 turn at cold end of L3 (link in between last turn)
L5 —5 turns No. 18 ¾ in. diam. ½ in. long. centre tapped.
L6 —2 turns at centre of L5 (loose coupled).
L7 —Same as L6 loose couple to L8.
L8 —6 turns No. 20 ¾ in. diam. 1 in. long, C.T.
L9 —6 turns No. 18 ¾ in. diam. ¾ in. long, C.T.
L10—2 turns link loose couple between centre turns.
L11—Same as L10—couple between centre of L12.
L12—2 turns ¾ in diam. ½ in. long, C.T.
L13—3 turns 1½ in. diam. 1½ in. long, C.T. (Plate lines would be better.)
L14—Link.
L15—36 turns No. 24 close wind on slug, former 5/16 in. diam, C.T.
L16—3 turns over centre of L15.

C1 —3-20 pF. plunger type.
C2 —3-16 pF. plunger type.
C3 —3-10 pF. plunger type.
C4 —2 x 15 pF.
C5 —3-30 pF. Philips.
C6 —3-30 pF. Philips.
C7 —2 x 10 pF.

* 48 William St., Mt. Waverley, Vic.

KEVIN CONNELLY, VK3ARD

My first introduction into the Amateur ranks was as VK3ZBC in 1959. I obtained the full licence and the present call sign, VK3ARD, in 1960 and since then the main interests have progressed through a.m. and s.s.b. on both h.f. and v.h.f. bands to lately r.t.t.y., mainly on 14,090 Kc.

Although my occupation as a professional engineer (qualifications: Diploma of Electrical Engineering) is generally removed from the field of Amateur Radio, the technical experience from this hobby is often extremely useful, now that electronic equipment is becoming more and more involved in the 50 cycle power field.

The duties of Federal Treasurer fell to my lot (with gasps from the auditor!) when I joined Federal Executive in 1965.

THE IMPEDANCE METER

(Continued from Page 7)

ever, the resistance of the meter should be large compared to the highest resistance to be measured. Care should be taken not to exceed the ratings of the standard resistors when using either oscillator or d.c. voltage.

IMPEDANCE OF AUDIO TRANSFORMER

When checking the impedance ratio of say, an audio transformer rated at 500 ohm line to 4 ohm, connect a 4 ohm resistor across the 4 ohm winding so the transformer is matched to its proper impedance. Connect the primary to the "Z" terminals and make the measurement of impedance at one or more frequencies as desired. The impedance as measured and presented by the winding should be 500 ohms. The impedance of the 4 ohm winding can also be measured by connecting to the meter and placing a 500 ohm load on the primary terminals. Use the 1 ohm standard resistor and the v.t.v.m. reading in the "Z" position should be approx. 4 times that obtained in the "R" position, corresponding to an impedance of 4 ohms.

MEASUREMENT OF FILTER CHOKE

If you wish to use a choke rated at say 4 henries, the impedance measurement could be done at 100 cycles since this is the frequency of the largest ripple component in a 50 cycle full wave rectifier. At this frequency, since the impedance of an inductance is $2\pi fL$, the impedance is approx. 630L and the 4 henry choke should have 2520 ohms impedance. The 1K standard resistor should be used, and a reading of approx. 2500 ohms would be expected.

As impedance is affected by magnetic saturation produced by the direct current flowing in its winding, impedance can be measured under this condition by connecting the choke to a source of d.c. in series with a suitable resistor. The resistor should have a value of at least five times the impedance of the choke being measured so that the shunting effect of the low impedance of the power supply will not invalidate the measurement.

MEASUREMENT OF ELECTROLYTIC CAPACITORS

The meter can be used to measure impedance of electrolytics at various frequencies and at the higher frequencies it will be found that impedance does not decrease in inverse proportion to the frequency. This is because an electrolytic capacitor behaves approximately as a capacitance with a series resistance — determination of actual impedance values will shed much light on the filtering effectiveness to be expected.

IMPEDANCE OF A CATHODE FOLLOWER

To measure the output impedance connect as shown. The blocking capacitor C is used to keep direct current out of the circuit and its value should be such that its impedance will be small in comparison to the impedance being measured—check it first on the meter! Of course, there must be no signal present from other sources when making impedance measurements.

It should be noted that measurements can be of a high order of accuracy at low frequencies and low impedance values providing the v.t.v.m. is accurate. However, less accurate meters are not ruled out providing the meter error is a constant percentage over its range.

This is because the impedance measurement is a ratio of two voltages E_x and E_s, remembering that linear voltmeters have relatively large percentage errors near the zero end of the scale, whereas log type meters are equally reliable at any part of the scale.

At high impedance values and higher frequencies, > 15 Kc., the error can be reduced by artificially increasing the input impedance of the v.t.v.m. by placing a 1 meg. resistor in series with the high or ungrounded input terminal, and right at the terminal.

The need for this is explained by the fact that the shunting of the unknown impedance by the input resistance of the meter causes some error to be introduced.

For those interested in checking those disposal "boat anchors" or doing a little private investigation in the audio field, have a closer look at this simple device.

VK2 DIVISION

RADIO EQUIPMENT STORE

Have you found it difficult to obtain coil formers? The R.E.S. catalogue in the past listed a range of 7 mm. formers and cans. Now 4 mm. has been added. Full details are in the new catalogue. Briefly this is the range:

4 mm. Formers: Short (15 mm.) 7 cents; long (33 mm.) 8 cents. Cans—short single, short double, long single and long double, 10 cents. Bases—single and double to suit above combinations, 10 cents. Slugs—30 to 300 Mc. range, 5 cents.

7 mm. Formers: Refer catalogues. Short formers, 3 cm.; and long formers, 6 cm.; in either tag or eyelet bases. Cans to suit. There is a range of screwdriver or hexagan slugs from 100 Kc. to 300 Mc. A new former in the range is a 7 mm. by 1 inch with a 9-pin base.

A small selection of other sizes are carried. As the Store is staffed on a voluntary basis, please allow a few days to elapse for your reply or order. All inquiries to Radio Equipment Store, Wireless Institute Centre, 14 Atchison Street, Crows Nest, N.S.W.

S.S.B. ON V.H.F.

(Continued from Page 10)

supply or the complete h.t. supply perhaps) and an extension of the push-to-talk circuit to control the converter h.t. supply to its output stage, are all that is required to be done to the h.f. rig. These can easily be done so as to permit removal later.

(b) The regulated 150 volt supply to the overtone oscillator is essential to prevent frequency modulation effects with changing voltage I found that a separate regulated supply to this stage ensured a stable signal and this runs energised on both receive and transmit.

For good measure I took this regulated supply, a second regulated supply for the screens of the driver, and the 250 volts supply for all except the 6/40 output stage, from the one supply and it all runs continuously—no switching required.

(c) A bias supply (taken via a ½ wave silicon rectifier from the transformer in (b)) is distributed to separate potentiometers for the mixer, driver and output stages. Each pot. is adjusted separately to give the required standing plate currents (see table). This arrangement makes the adjustments very easy.

(d) Although it is likely that the mixer could drive the 6/40 stage directly, the driver provides the necessary tuned circuits to reject the unwanted 130 Mc. and 116 Mc. (130-14) output.

TABLE 1

Measured operating values are:—

Mixer plate current	12 mA.
Driver plate current to 45 mA.	35 mA. kicking
6/40 plate current to 105 mA.	40 mA. kicking

Check that no grid current appears in the mixer, driver or final stages. **Do not overdrive the mixer from the 14 Mc. input!**

Anyone further interested in constructional diagrams, operating values, etc., could contact the writer. There are at least four of these units in operation in VK3 on 2 mx at present.

CHANGE OF ADDRESS

W.I.A. members are requested to promptly notify any change of address to their Divisional Secretary, not direct to "Amateur Radio"

WARBURTON FRANKI

NEWMARKET PACKAGED CIRCUIT AMPLIFIERS

SPECIFICATION DETAILS:

Data	PC1	PC2	PC3	PC4	PC5	PC7	PC9
Power Output mW.	150	400	400	400	3W	800	Pre-Amp.
Input Impedance—ohms	1.5K	1K	2.5K	220K	1.5K	1.5K	1M
Output Impedance—ohms	40	15	15	15	3	8	600
Supply Voltage —volts	9	9	9	9	12	9	9
Typical distortion %	2	3	3	3	3	3	1
Frequency response	300-15K	200-12K	200-12K	200-12K	50-12K	50-12K	20-20K
Overall Dimensions All ⅛ in. high.	2x1	2½x1½	2½x1½	2½x1½	5½x1⅝	3x1⅝	2x1
PRICE	$5	$6.27	$6.27	$6.27	$12.47	$7.53	$4.50

Plus Sales Tax 12½% and postage.

SUGGESTED APPLICATIONS:

PC1—Audio Amplifier. Intercom. Amplifier. Lab. Instr. Amplifier.

PC2—Modulator Drive Stage. Church Hearing Aid Amplifier Tape Replay Amplifier. Mine Communication Amp. Telemetry Audio Amp.

PC3—D.C. Relay Driver. Sound-level Meter Amp. Low power Battery Stereo. Heating and Ventilating Control Amp.

PC4—G.P. Amp. and Driver's Office Dictating Machines. Listening Booth Amps.

PC5—Portable Audio Amps. Car Radio Audio Amps. Servo Amplifier. Tape Relay Amp. Automation Drive Amp. Burglar Alarm Amp.

PC7—Tape Language Lab. Telephone Dictating Machine Amps. Control Amp. for Textile Machinery.

● Write or Call for Data Leaflet.

BELPHONE INTERCOMM. SYSTEMS

Comprises two Handsets (similar P.M.G. telephone) and connecting wire. Very clear reproduction. Loud bell to call.

$8.65 set (inc. batteries) + 12½% S.T.

SIDAC New Silicon Symmetrical Diode

The SIDAC is a five-layer semiconductor device (NPNPN) having two terminals, greatly simplifying a.c. control circuits. Being bi-directional, one SIDAC can replace two SCR's in conventional control systems. In addition, blocking voltages are less temperature sensitive in the SIDAC and since there is no reverse direction, voltage transients do not injure the device. Current surges also are less damaging than those encountered in SCR's as the current is not initially confined to a small area near a gate. The SIDAC is cheaper than comparable SCR's. Firing the SIDAC is simplicity itself. Either a parallel or series circuit may be used and a specially developed pulse diode is available with suitable pulse transformer.

Type K5B20: Normal a.c. (r.m.s.) Circuit Voltage, 240 r.m.s., Current capacity 5 amps.

$3.45 + S.T. 12½%

Pulse Diode, Type K2C . . 78c plus S.T. 12½%
Pulse Transformer .. .. $1.20 plus S.T. 12½%
Please add packing and post, 10c set.

NOTE: A Circuit is available for making a 1,000 watt Light Dimmer using K5B20, K2C, Pulse Transformer and a few Resistors and Condensers. Write or call for a copy.

RESISTORS

English Erie, 1 watt, ±10%. Most preferred sizes are available.

50 for $2 plus S.T. 25%. Plus pack and post 5c.

DITTO ½ WATT: 50 for $1.00 plus S.T. 25 %. Plus pack and post 5c.

Small Imported Electrolytic Condensers

WHILE THEY LAST—ALL ONE PRICE

12c each or lots of 50, $5, plus S.T. 25%.
Plus pack and post 10c.

2, 5, 10, 25, 50, 100 uF. 6 v.w.
2, 5, 10, 25 uF. 12 v.w..
2, 5, 10, 50 uF. 25 v.w.
2, 5, 10, 25 uF. 50 v.w.

NEW! MINIATURE POWER SUPPLY

6, 9, 12 volts at 500 mA. Useful for transistor equipment such as tape recorders, record players, radiograms, etc. May also be used as trickle charger for car batteries.

$10 + 12½% S.T.

LOUDSPEAKERS 4"

Available in 3.5, 8 or 15 ohms impedance.

$1.50 + 25% S.T.

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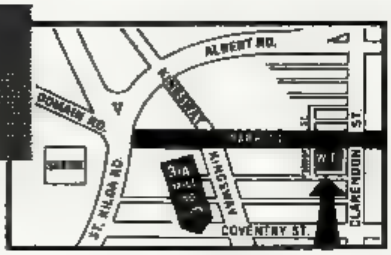

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WIRELESS INSTITUTE OF AUSTRALIA—ITS ADMINISTRATION

G. MAXWELL HULL, VK3ZS, Federal President*

IT is probably true to say that in any organisation, society, club or institute, the members of the organisation, unless actively engaged in its administration, know very little about how it functions. There are exceptions to this and a few members **do** like to know the ins and outs of the organisation to which they belong and pay their subscriptions, so they interest themselves in finding out.

However, this short article is directed to the member of the Wireless Institute of Australia—and any non-member who reads the Institute's magazine—so that he can find out in 10 or 15 minutes' reading what might otherwise take a considerable time. It is hoped you will find it interesting and enlightening.

Let's take a brief look at Australia to refresh our memories. The map of Australia is broken into States with their respective Call Areas. These Call Areas also represent a Division of the W.I.A., therefore we have the N.S.W. Division (VK2), Victorian Division (VK3), Queensland Division (VK4), South Australian Division (VK5), West Australian Division (VK6) and the Tasmanian Division (VK7). Then we have the Territorial Call Areas of the Australian Capital Territory (VK1), Northern Territory (VK8), Territory of Papua and New Guinea (VK9) and Antarctica (VK0).

In addition there are a number of islands around Australia which adopt the call prefix of the State under whose jurisdiction they are administered, and for the purposes of being attached to the W.I.A., licensees in these areas are members of that State's Division. In this way also, members residing in the Australian Capital Territory (A.C.T.) become members of the N.S.W. Division, although it is envisaged one day there will be enough VK1 licensees to form a VK1 Division of the Institute.

Broadly speaking, the Federal organisation of the Wireless Institute of Australia consists of all the Divisions grouped together as one body. It is governed and administered by a **Federal Council** composed of a member representative, known as the **Federal Councillor**, from each Division of the Institute. Because its financial resources are limited, and the Divisions are separated by quite large distances, it is not practical or financially possible at this stage of its growth for the **Federal Council** to meet more than once a year which it does at Easter time.

The **Federal Council** is responsible for formulating the Institute's policy on matters that concern the Institute at Federal level. At present the **Federal Council** must vote (whether at a Federal Convention or when required during the year) either in accordance with a voting instruction from his Division, or by a vote which must subsequently be ratified by his Division.

The implementation of the decisions of the **Federal Council** is the responsibility of a group known as the **Federal Executive**. This **Executive** body is composed of a Federal President, Federal Vice-President, Federal Secretary and four other persons who may carry out the functions of Federal Business Manager, Federal V.H.F. Manager, Federal Treasurer and Federal Publicity Manager, or any other "title" which from time to time may be "attached" to these Officers. Under its Constitution the **Federal Council** may also authorise the co-option of any further number of personnel who can hold ex-official appointments in order to carry out specific duties.

And so the **Federal Executive** acts for, and on behalf of, the **Federal Council** in managing the Institute by carrying out its policies and administrative decisions, acting for the Institute in negotiations with the Postmaster-General's Department in respect of the Regulations under which the Amateur Service is permitted to operate in Australia, liaising with overseas organisations concerning matters pertinent to world-wide Amateur Radio, acting on behalf of the Federal Council in matters which in the opinion of the Federal Council may concern more than one Division, dealing with its finances in such manner as may be from time to time determined by the Federal Council and directing the editorial policy of the official organ of the Institute—**"Amateur Radio"** Magazine insofar as it relates to Federal matters.

Because the Central Administration of the Postmaster-General's Department has always been located in Melbourne, the Federal Council's policy has always been that its Executive should also be located there. For this reason the Victorian Division has always been known as the **Headquarters Division**, and under the Federal Constitution has been responsible for selecting and nominating the appointments to the **Federal Executive**. Each year these nominations are submitted to the Divisions for approval and so it is that each Division has its "say" in who is appointed and has the power to reject any nominee who it considers unsuitable to hold office.

Probably the most important man in the W.I.A. Federal organisation is the Divisional **Federal Councillor**. As his Division's representative on the **Federal Council** he is responsible to convey information from his Divisional Council to the Federal Executive and from the Federal Executive to his Divisional Council.

He should be nominated by the members of his Division after careful selection because he carries a heavy responsibility to see that the wishes of the members of his Division are properly directed to the **Federal Executive** where it is the prerogative of the **Federal Council** to deal with them; and it is his further responsibility to convey to the members of his Division through his Divisional Council the results of any such representations or of any other matters dealt with by the **Federal Executive** on behalf of the **Federal Council**.

Because of his unique position he has two important areas of judgment in which he must be involved; one in his Divisional Council with the affairs of his Division on behalf of its members, and the other with the Federal Executive on behalf of the Federal Council. This means he must be a person with "vision" and able to divorce his mind from a Divisional outlook when acting as the liaison between his Divisional Council and the Federal Council.

With the exception of the Federal Traffic Officer (who doesn't always exist) and the Federal QSL Officer, all communications between the Federal Executive and the Divisional Council passes through the hands of the Federal Councillor. When the **Federal Traffic Net** is in operation it passes traffic by radio communication from the Federal Executive to the Divisional Traffic Officer who passes the information on to the Federal Councillor in his Division. This traffic net was used consistently and efficiently in years gone by but with the advent of fast airmail services and the difficulty in obtaining the services of good c.w. operators in every Division, the net has currently ceased to function. The Federal QSL Officer has direct contact with the QSL Officers in each Division and this is the only function of the Institute's Federal Administration which does not pass through the hands of the Federal Councillor.

This briefly explains the Institute's administration down to the Divisional Council level. Each Division has its own **Council** which is appointed by, and acts on behalf of, its members, and the Division functions under its own **Memorandum of Articles of Association** (or **Constitution**). All the Divisions—with the exception of the Queensland Division—are registered as

G. M. HULL, VK3ZS

Licensed with call sign VK3ZS since 1937. Past Federal Secretary of the W.I.A.—six years. Present Federal President — 4th term. Manager and director of small electronics firm. Director of East Recording Company. Public address equipment engineer. Active on the air on s.s.b. 50 years of age and active with table tennis and tennis as sporting relaxation. Ex-R.A.A.F. W/T operator (air) and wireless mechanic, six years during World War II.

* 22 Dryden St., Canterbury, E.7, Vic.

Companies or incorporated **Associations** for the protection of their members. Since 1952 each Division has adopted a constitution which is almost identical in each State (The Uniform Divisional Constitution) which permits all Divisions to operate in very much the same manner.

The Memorandum and Articles of Association of your Division is available to you on request if you did not receive a copy when you joined the Institute in your State. The document gives you the power to vote (if you are a full member) and it is worth your while to peruse it occasionally so that you can raise your problem through the correct channels and have it dealt with by the Federal Administration if it is a matter which concerns Amateur Radio generally and not in the nature of a purely domestic problem. If your problem is a domestic one, then you should have it dealt with by the Council of your Division.

Your Division is divided into **Zones** or **Branches**, and there are **Clubs** in your State which are affiliated with your Division. These organisations indulge in Emergency Networks (where such are active), Fox Hunts, Scrambles, Exhibitions, V.h.f. activities and other kinds of interesting events peculiar to the hobby of Amateur Radio.

Your State Division provides the personnel for other groups in addition to your Divisional Council. All States may not have the numbers to be active in all spheres but generally there is a V.h.f. Group, Short-Wave Listeners' Group, W.I.A. Communications Emergency Network (W.I.C.E.N.), Amateur Operator Certificate of Proficiency Classes which train you to the standard necessary to gain your transmitting licence, Youth Radio Scheme (Y.R.C.) Organisation and other special groups, all of which work for the good of Amateur Radio.

And finally, there is the **Publications Committee** of the Headquarters Division. On behalf of all the Divisions of the W.I.A. it publishes "**Amateur Radio**" Magazine which is the official Federal Organ of the Institute. There is direct liaison between this Committee and the Federal Executive where discussions can take place on national and international matters or matters of policy of concern to the Federal Council.

The Publications Committee is also responsible for the printing of the **Australian Radio Amateur Call Book**, Amateur Station Log Books and Contest Log Sheets. The costs of these publications are borne by the Headquarters Division.

From all this you may wonder how the Institute gains its finance! This comes from your subscription when you join as a member. The fee might vary a little between States depending upon the overhead carried by individual Divisions. The larger Divisions own freehold property so their fees are a little higher than the smaller Divisions. However, compared with other organisations, W.I.A. fees are quite modest for the work the Institute does in protecting and maintaining the hobby of Amateur Radio for this generation and the generations ahead.

In conclusion I would like to express a few personal thoughts regarding the W.I.A. organisation and the future.

To my mind the most important single function of the Institute is the representation of the Australian Amateur Licensee whether he be a member or not, the protection of Amateur operating privileges and the maintenance of reasonable regulations governing Amateur Radio in this country.

This requires the expenditure of not a little finance and a great deal of time which, perforce, must at this stage be forthcoming from men of calibre, enthusiasm and experience in an honorary capacity if we are to adequately meet future problems.

In discussing our Federal Organisation one should ask if there are any shortcomings? And if one had served —or was serving—in an administrative capacity in any part of the organisation, the answer would very probably be—yes! The organisation as briefly detailed in this article has been operating under a Constitution which is quite old and which was last amended in 1947, whilst the membership over this period has grown from about 1500 to over 5000 and is steadily increasing. From "inside" the organisation it is obvious that the existing Constitution, whilst having served a most useful purpose, is outdated and needs overhauling with a view to making the Institute "work" with the efficiency which modern day enterprises demand if we are to combat the pressures which are manifest, and of growing concern, to Amateur organisations all over the world.

Such a shortcoming in our organisational setup is not something new, for as far back as 1960, the Late John Moyle, VK2JU, who represented the W.I.A. as an official observer with the Australian Delegation to the 1959 I.T.U. Conference, had this to say:—

> "Closer to home we have two major reforms to make. Firstly, we must obtain a much greater sense of Federal responsibility from the ordinary Amateur and from the Divisions.
>
> "Secondly, we must evolve a Federal set-up which will work . . . At present the Federal Council isn't doing its job, and the Federal Executive has become exhausted trying to cope with an almost impossible situation.
>
> "I am not intending here to supply a set of answers to this matter, which is an ideal item for a Convention if there ever was one.
>
> "But I am prepared to say that unless we are prepared to solve the problem, and to spend money doing it, we can't blame . . . anyone . . . if Amateur claims are overlooked because we are inadequately organised to handle them.
>
> "To my mind it is an urgent and critical situation."

These were strong words from an Amateur whose views must be respected, for he above all was in a position to understand the problems of our organisation.

In 1962, with a knowledge of these problems in mind, the Federal Council set about writing a new constitution designed to Federate the W.I.A. so that it could work with the efficiency required of it. To date it has produced three completed drafts all of which were torn apart by the Federal Council to produce a fourth and (it was hoped) final draft. This appears to be nearing acceptance by all Divisions.

The most important of the proposals for a new **Federal Constitution** was firstly, the establishment of new procedures to enable both the Federal Council and the Federal Executive to reach decisions more rapidly; the system existing today of a **Federal Council** representative having to have "instructions" from his Division in order to vote, or having to have his vote ratified by his Council if he voted without instructions is surely archaic and frustratingly time consuming in the extreme!

Secondly, the Institute's Magazine, "Amateur Radio," presently the responsibility of the Victorian Division to finance and publish (together with the other publications aforementioned) should surely be a truly Federal obligation financed jointly by all Divisions through a proper Federal Organisation.

Thirdly, to enable the above ideal conditions to exist in such manner that financial protection is afforded for those engaged in the administration and the members alike, it is proposed that the Federal Organisation be registered as a Company.

Fourthly, the **Federal Executive** must have more freedom to formulate policy between Federal Conventions whilst remaining subject to policy decisions of the **Federal Council**; and procedures will no doubt be evolved by which the **Federal Executive** can seek guidance from the Divisions whilst arbitrating on their behalf.

The proposed Constitution is envisaged as being a continuation of the existing basic organisation, namely that the Divisions together form the Company represented by the Federal Councillors. Here is not the place to enter into a discussion of the mass of detail that has gone into the formulation of the machinery of the provisions of the drafts. However, the overall objective has been to provide a suitable framework within which the Federal body can work with room for flexibility to meet the needs and problems of the future.

A majority of the Divisions have agreed to a final amended draft. I believe that the near future will see an agreement by all the Divisions, and this will mark a vital milestone in the development of the Wireless Institute of Australia as the representative body of the Amateur Service in Australia.

One point has repeatedly been made —that a constitution and rules do not of themselves make an organisation strong and effective. Only the calibre of the men who are appointed to carry out the respective tasks demanded by an organisation can do this, and then most effectively only with the support of every member they represent.

(Continued on Page 22)

AMERICAN DOW-KEY ANTENNA RELAYS

Coil Ratings 6, 12, 24 volts d.c. at 2 watts. 6, 12, 24 volts a.c. at 6va., 50-60 cycles. Special coil voltages available on request. R.f. Ratings: 1kw. power rating to 500 Mc.; 20 watts power rating to 500 Mc. in types DK60-G and DK60-G2C in de-energised condition. The DK60-G and DK60-G2C have a special isolation connector in the de-energised position to reduce cross-talk to a minimum.

V.S.W.R.: Less that 1.15:1 from 0 to 500 Mc. (50 ohm load).

Isolation: Greater than 60 db. at 10 Mc. in DK60 and DK60-2C, greater than 100 db. from 0 to 500 Mc. in DK60-G and DK60-G2C when in energised position.

Operating Time: Less than 30 milliseconds from application of coil voltage; less than 15 milliseconds between contacts.

Connections: Standard SO239 type v.h.f./u.h.f. Co-ax. Connectors. Available with Type N, BNC, TNC and C Connectors to order. $4.16 extra.

	D.C.	A.C.
Type DK60 standard single-pole change-over	$18.13	$19.25
Type DK60-G standard single-pole change-over with special isolation contact in de-energised position to reduce cross-talk	$20.15	$21.15
Type DK60-2C, same as DK60, but includes external set of double-pole change-over contacts	[illegible]	[illegible]
Type DK60-G2C, same as DK-60-G but with external double-pole change-over contacts	$21.78	$23.30

DOW-KEY MANUAL CO-AXIAL SWITCHES

R.F. Ratings: 1kw. to 500 Mcs.
Fine Silver Finish. Fitted with UHF type SO239 co-axial sockets.

DK75-2 Single Pole two throw	$18.22
DK75-3 Single Pole three throw	$18.68
DK75-6 Single Pole six throw	$20.25
DK75-T Transfer Switch	$19.80

MECHANICAL FILTERS

COLLINS Type F455A Mechanical Filters, 455 Kc. Wiring instructions with each unit.

Price (inc. S.T.): $35.

LOW PASS FILTERS

A "Cabena" Low Pass Filter will fix t.v.i. Cut-off frequency, 30 Mc., attenuation at 60 Mc., better than 30 db.; insertion loss, negligible. Impedance 50-72 ohms.

Price $11.50

PENETROX "A"

Famous American aluminium and copper corrosion inhibiter. Avoid bad electrical connections and corroded joints on beam antennas, T.V. antennas, etc. Use—

PENETROX "A"

Price: $1 per tube

C.R.C. FORMULA 2.26 FLUID

For use on electronic and electrical equipment of all kinds. Displaces water and moisture. Improves electrical properties. Protects metal surfaces and lubricates.

16 oz. pressure packs, **Price $3.00**

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4-Page Lift-out Supplement listing selected range of products useful for Amateur use.

PRICES INCLUDE SALES TAX, BUT ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Availability of Imported Lines are subject to delivery from overseas from time to time.

A & R TOROID BALUNS

General Specifications: Power rating—Types A, B, C, 300 watts or 600 watts p.e.p., provided the s.w.r. is less than 2 : 1. Construction—Toroidal ferrite cores, fully encapsulated with epoxy resin and silica under vacuum. Suitable for use in cold to sub-tropical areas. All except 356C and 356C are provided with antenna insulator support brackets. Balun dimensions approx. 2 in. diam. x 1 in. plus socket and lugs. Weight approx. 3¼ to 4 oz.

Type 350A—Impedance ratio 1 : 1. 75 ohms unbalanced to 75 ohms balanced. 3 to 30 Mc. For use at centre of a dipole antenna with co-axial cable feed line or at base end with 75 ohm twin line. Co-axial connector is Belling & Lee L604/S and lug terminals. **Price $3.77 (inc. S.T.)**

Type 351A—Impedance ratio 1 : 4. 75 ohms unbalanced to 300 ohms balanced. 3 to 30 Mc. For use at centre of a folded dipole antenna with co-axial feed line or at base end with 300 ohm twin line connector and terminals as 350A. **Price $3.77 (inc. S.T.)**

Type 352A/BC—Details as 350A except frequency range 500 Kc. to 3 Mc., or to 30 Mc., for receiving purposes only with increased attenuation. **Price $3.77 (inc. S.T.)**

Type 353B—This is a type 350 with a co-axial socket SO-239 (Amphenol screw type). **Price $4.40 (inc. S.T.)**

Type 354B—Type 351 with SO-239 co-axial socket. **Price $4.40 (inc. S.T.)**

Type 355C—Impedance ratio 2.1 : 1. 52 ohms unbalanced to 25 ohms unbalanced. 3 to 30 Mc. For use at the base of a mobile whip antenna, coupled to fixed or adjustable transmitter output impedance. Lug terminals. **Price $3.50 (inc. S.T.)**

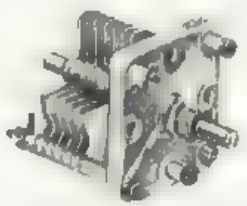
Type 356C—Impedance ratio 3.1 : 1. 75 ohms unbalanced to 25 ohms unbalanced. 3 to 30 Mc. Lug terminals. Use as 355C. **Price $3.50 (inc. S.T.)**

"ADEL" NIBBLERS

Makes area cut-outs for transformers, etc., as simple as ABC. **Price $7.50.**

CO-AXIAL FITTINGS AND CABLE

PL259 Co-axial Plugs, suit ⅜ in. cable	$0.88
SO239 Co-axial Sockets	95c
UG175/U and UG176/U cable Adaptors for use with PL259	$0.34
C32-16 Right-angle co-axial connector Jack to Plug, suit PL259	$1.88
C32-17 T. Connector—Plug and two Jack Ends—suit PL259	$2.33
C32-14 Coupling for two PL259 Plugs	$1.12
Belling & Lee L734P Co-ax. cable plug	$0.53
,, ,, L604S co-ax. chassis-socket	$0.35
,, ,, L603/B co-ax. chassis socket ground insulated	$0.25
,, ,, L734/S recessed co-ax. chassis socket	$0.35
,, ,, L734/J co-ax. cable socket	[illegible]
,, ,, L1421 Bulk-head cable socket	$0.50
,, ,, L616 Coupling — couple two L734/P plugs	$0.26
PT81M (UR67) 52 ohm co-axial cable, per yard	33c
RG58AU 50 ohm co-axial cable, per yd.	$0.35
PT9M 56 ohm co-axial cable, yd.	35c
PT77M 70 ohm (UR70) co-ax. cable, yd.	32c
PT11M 70 ohm co-axial cable, yd.	40c
FORMULA 11 open wire 300 ohm transmission line, 100 ft. coils	$5.00
K20 72 ohm Twin Flat Line yd.	15c
KA47 300 ohm Twin Flat Line (solid or slotted) yd.	8c
KA48 300 ohm Heavy Duty Flat Line solid or slotted) yd.	19c



EDDYSTONE CONDENSERS

478 Split Stator 15 x 15 pF.	$2.90
880 Single Section 13.5 pF.	1.95
881 ,, ,, 63 pF.	2.08
882 ,, ,, 63 pF.	2.90
583 Split Stator 38 x 38 pF.	2.90
884 Butterfly 32 x 32 pF.	3.25
585 Single Section 91 pF.	2.90
586 ,, ,, 140 pF.	3.90
587 Butterfly 16 x 16 pF.	2.90
588 Single Section 27.5 pF.	2.90
589 ,, ,, 66 pF.	2.90
719 Differential 25 x 25 pF.	2.10
730 Butterfly 10 x 10 pF.	3.25
738 Double Bearing 100 pF.	3.27
817 Tx Type S. Section 270 pF.	3.15

"JABEL" TR14 REAMERS

Ideal for clean finish on small panel holes and cleaning out for neat fit.

Price: $1.05 each.

HEADPHONES

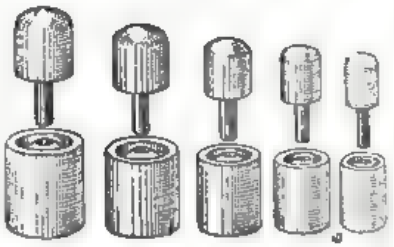
Brown's Type F 2,000 ohm high impedance	$14.15
Akal AS68S Stereo/Mono 16 ohm low impedance	$15.68

WILLIAM WILLIS & CO. PTY. LTD.

430 ELIZABETH STREET, MELBOURNE, C.1 **Phone 34-6539**

William Willis & Co. Pty. Ltd., 430 Elizabeth St., Melbourne, C.1

PUNCHES



WILLIS HAMMER DIE PUNCHES

WILLIS hammer type die punches are made to precise sizes for use in industry wherever a clean, round hole is wanted. Designed to punch down to 14 gauge steel. Centre remnant removed with a flick of the hand. Can be used in die press. Special sizes made to order at slight additional cost.

3/8 in.	$2.40	1-1/2 in.	$6.00
7/16 in.	$2.40	1-5/8 in.	$6.40
1/2 in.	$2.60	1-3/4 in	$7.20
5/8 in.	$2.60	1-7/8 in.	$8.00
11 16 in.	$2.80	2 in.	$8.40
3/4 in.	$3.00	2-1/16 in	$5.[illegible]
13 16 in	$3.20	2-1/8 in	$9.00
7/8 in.	$3.80	2-3/16 in.	$9.40
1 in.	$3.80	2-1/4 in.	$9.60
1-1/16 in.	$4.00	2-5/16 in.	$9.60
1-1/8 in.	$4.00	2-3/8 in	$10.40
1-3/16 in.	$5.00	2-1/2 in	$11.00
1-1/4 in.	$5.20	2-3/4 in	$12.40
1-5/16 in.	$5.20	3 in.	$13.40
1-3/8 in.	$5.60	3-1/4 in.	$15.80
1-7/16 in.	$5.80	3-1/2 in	$18.20

Q-MAX CHASSIS PUNCH

SCREW TYPE

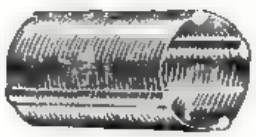
3/8 in.	$1.88	1 7/32 in.	3.80
7,16 in.	2.00	1 1/4 in.	3.80
1 2 in.	2.00	1 5/16 in.	4.08
9/16 in.	2.00	1 3/8 in.	4.08
5/8 in.	2.00	1 1/2 in.	4.08
11/16 in.	2.56	1 5/8 in	4.44
3/4 in.	2.56	1 3/4 in.	4.44
13 16 in.	3.08	2 in.	5.60
7 8 in.	3.08	2 3/32 in.	6 64
15, 16 in.	3.88	2 1/2 in.	7 92
1 in.	3.68	1 in sq hole	5.56
1 1 16 in.	3.68	11/16 in s. hole	5.32
1 1/8 in.	3.68	21/32 x 15/16	
1 3/16 in.	3.68	rectang hole	7.82

INSTRUMENT BOXES

Cat. No 896

These virtually water-tight die-cast boxes are made of zinc alloy material in four sizes. Each box is supplied with a close-fitting flange lid, securely held with countersunk 4 BA screws. Natural finish. These substantial boxes are invaluable for many purposes. Sizes available —

Type 650	4 1/8 x 3 1/8 x 2 in.	$2.79
Type 845	7 3/8 x 4 1/8 x 2 in.	$4.50
Type 896	4 1/4 x 2 1/4 x 1 in.	[illegible]
Type 903	7 3/8 x 4 11/16 x 3 in.	[illegible]



"WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding— use "WILLIS" AIR-WOUND INDUCTANCES

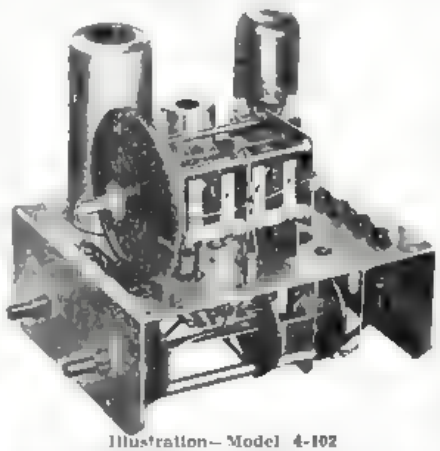
No	Diam. Inch	Turns per Inch	Length Inch	B & W Equiv	Price
1-08	1/8	8	3	No. 3002	59c
1-16	1/8	16	3	No. 3003	69c
2-08	1/4	8	3	No. 3006	70c
2-16	1/4	16	3	No. 3007	70c
3-08	3/4	8	3	No. 3010	82c
3-16	3/4	16	3	No. 3011	82c
4-08	1	8	3	No 3014	95c
4-16	1	16	3	No. 3015	95c
5-08	1 1/4	8	4	No. 3018	$1.28
5-16	1 1/4	16	4	No. 3019	$1.28
6-10	2	10	4	No. 3907	$1 55

Special Antenna All-Band Tuner Inductance (equivalent to B. & W. No. 3907 7 in.)

7 in. length, 2 in. diameter, 10 turns per inch, $1.76

References: A.R.R.L. Handbook, 1961, 'QST,' March 1959, 'Amateur Radio,' Dec. 1959.

GELOSO V.F.O.



Illustration— Model 4-102

Model 4/104 V.f.o. Unit. Tunes 80, 40, 20, 15, 11 and 10 metres. Complete with calibrated dial and escutcheon. Uses 6CL6 and 5763 valves. Price (valves extra) $24.55.

Model 4/102 V.f.o. Unit. Tunes 80, 40, 20, 15 and 10 metres. Complete with calibrated dial and escutcheon. Uses 6J5G, 6AU6 and 6L6 valves. Price (valves extra) $24 55

Model 4/105 V.f.o. Unit. High stability unit using output from relatively low variable frequency generator mixed with the output from a quartz-crystal generator. Low frequency generator covers range of 500 Kc. on the 80, 40, 20 and 15 metre bands and 1 Mc on two sections of the 10 metre band. Uses 6U8, 6AH6 and 6CL6 valves. Suitable for use in s.s.b. transmitter. Price (valves and crystals extra), $38.43.

Each model comes complete with calibrated dial, pointer and perspex escutcheon. Full circuit diagram with each kit. Valves and crystals extra.

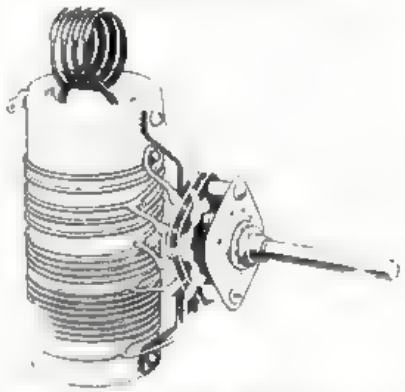
GELOSO KIT FOR D.S.B. TRANSMITTER

The following components comprise the GELOSO Kit for construction of D.s.b. Transmitter. For circuit details refer Nov. 1965 issue of 'Electronics Australia'.

4/105 Crystal controlled Beat Frequency Oscillator	$28.12
N1637 Calibrated Dial, Pointer and Escutcheon	$6.30
N4 113 Pi-Coupler	$4.05
N771 Condenser	$4.50
N774 Condenser	$4.50
N178.4 All Wave R.f. Choke	95c

Valves not supplied with V.f.o. Valves for V.f.o. 6U8, 6AH6, 6CL6.

PI-COUPLERS



WILLIS MEDIUM POWER TYPE

For use up to 600 watts p.e.p. Match plate loads of 2,000 to 3,500 ohms (Z) and higher into co-axial cable. Operating Q increases on higher frequencies to increase harmonic suppression enabling practical values of tuning capacity to be used on 10 and 15 metres and allowing for wiring inductance. L incorporates extra switch section for shunting additional capacity (C) if required, or switching other circuits. Switch rated for 10 amps. at 2,000 volts with contact resistant (R) of 0.8 milli-ohms. Price $8.85

Geloso Pi-Coupler Type 4/111 for use with parallel 807's, 6146's, etc. 75 w. $3.94.

Geloso Pi-Coupler Type 4/113 for use with S-ended 807 6146, etc. 75 w. $3.94.

Geloso Pi-Coupler Type 4/115 for use with parallel. 807's, 6146's, etc. 100 w. $4.37.

COIL FORMERS

3/4 inch Poly. Formers with mounting base and iron slug	30c
7/16 inch Paxolin Formers with mounting base and iron slug	33c
3/8 inch Poly. double slugged I.F. Formers with can	81c
Two-pin Polymax G.d.o. Formers with winding protective shroud for inductances	72c

EUROPEAN DIN TYPE CONNECTORS

Three pin cable male Type S3	55c
Three pin cable female Type K3	68c
Three pin chassis female Type B31	18c
Five pin cable male Type S5	60c
Five pin cable female Type K5	71c
Five pin chassis Type B51	18c

PLEASE INCLUDE FREIGHT WITH ORDERS

William Willis & Co. Pty. Ltd., 430 Elizabeth St., Melbourne, C.1

TEST EQUIPMENT

S.W.R. METERS

KYORITSU Model K-109 Standing Wave Ratio Bridge, 1 : 1 to 1 : 10 s.w.r. Impedance 50 and 75 ohms. Frequency range 1.5 to 60 Mc. Includes 0-100 d.c. microammeter $20 inc. sales tax.

GRID DIP OSCILLATORS

Transistorised **Eddystone** Edometer" type Grid Dip Oscillator, 390 Kc. to 115 Mc., with set of seven plug-in coils. Zener stabilisation maintains constant performance with falling voltage. Can be used as g.d.o., for resonance checks on tuning circuits, for actual measurement of inductance and capacity. An in-built modulator stage provides use as signal generator for receiver alignment or as a signal source for audio tests. Can be used as absorption wavemeter, heterodyne wavemeter and modulation monitor. Tuning is simplified by geared reduction drive while the clearly calibrated scale permits rapid reading. Meter sensitivity is adjustable. Unit includes jack for morse key for use as morse code practice oscillator. No external power source required. **Price $84.75** (inc. S. Tax).

SIGNAL GENERATORS

Leader LSG11, 120 Kc. to 230 Mc.

Frequency range (six bands) 120 Kc. to 130 Mc. on fundamentals, 130 Mc. to 230 Mc. on harmonics. Mod. frequency 400 and 1000 cycles. Uses 12BH7, 6AR5 plus selenium rectifier. Provision for xtal oscillator by use of external xtal (xtal not supplied), 1 to 15 Mc. Dimensions 7½ x 10¾ x 4¾ in. Professionally finished, grey crackle enamel.

Price $30.75

VACUUM TUBE VOLT METER

"KYORITSU," MODEL K-142

Highly dependable for measurements of voltages from d.c. to r.f., output (db) and d.c. resistance

A.c. volts Sine wave 0.1v.-1500v., 7 ranges. Peak to peak 0-4000v., 7 ranges. Output db m) minus 20 db to plus 65 db. Input Impedance: 1.4 megohms.

D.c. Volts 0.1v.-1500v., in seven ranges. Input Impedance, 11 Megohms.

Resistance: 0.2 ohm to 1000 Megohms, in seven ranges

The K-142 Vacuum Tube Voltmeter uses a P-60 d.c. 200 microammeter and operates from 240 volts 50/60 cycle a.c. mains. Large clearly calibrated meter gives ease of reading.

Price $56.25 (Inc. S. Tax)

KIKUSUI MODEL 539 3" C.R.O.

240v. a.c. operation. Printed circuit board wiring. 5 c.p.s. to 1 Mc., time base oscillator to sweep 10 c.p.s. to 100K c.p.s. in steps with continuous in-between variation. Ideal s.s.b. measurement with coupled r.f. sampling signal. Weight 11 lb.

Price $135. (Full instruction book supplied)

GELOSO INTER-COMMUNICATION SET

Here is the intercom system that you can install in half an hour with the greatest of ease!

N 9504—Master Unit

This is the basic set of every system. It contains a 5-transistors amplifier, a loudspeaker microphone and the feed batteries. Case in shockproof material, with rear apertures to fasten the set on the wall. Supplied with 3 meters of flex and plug. **$19.84**

N 9505—Slave Unit for Indoor Use

It contains a loudspeaker/microphone. Case in shockproof material, with rear aperture to fasten the set to the wall. With 0.30 metre of flex and plug. **$3.16.**

N 9507—Slave Unit for Outside Use

It contains a loudspeaker-microphone with waterproof impermeabilised protection. Case in shockproof material to be set flush in wall or on panel. Rear screw terminals to fix d.e line cable. **$3.51**

The **"Geloso"** Inter-Communication System is not a toy. It is designed for rugged use wherever communication is wanted between various points—in an office block, home, hospital or shop. **Write for free brochure on installation ideas and details.**

MICROPHONE CONNECTORS

Acme-Amphenol Type Male and Female Cord and Chassis Connecting

Centre single contact female cable	69c
Centre single contact male cable	60c
Centre single contact male chassis	45c
Centre single contact phone plug adaptor	63c
Single Pin male cable	70c
Single Pin female cable	70c
Single Pin female chassis	50c
Two pin cable male	75c
Two pin cable female	75c
Two pin chassis female	50c
Three pin cable male with lock ring	$1.05
Three pin cable female with coupling thread	90c
Three pin cable female with lock ring	$1.15
Three pin cable male with coupling thread	90c
Three pin chassis female	75c
Three pin chassis male	82c
Four-pin cable male with long ring	$1.15
Four pin cable female with coupling thread	$1.15
Four pin cable female with long ring	$1.21
Four-pin chassis female	83c
Four pin chassis male	90c

RECORDING TAPE

Top Quality Recording Tape, guaranteed no drop out.

Standard Play			
600 ft. x 5 in.	$2.57	600 ft. x 4 in.	2.82
900 ft. x 5¼ in.	3.49	900 ft. x 4¼ in.	3.80
1200 f. x 7 in.	4.35	1200 ft. x 5 in.	4.67
Long Play		1800 ft. x 5¼ in.	6.37
210 ft. x 3 in.	1.13	2400 ft. x 7 in.	7.81
450 ft. x 4 in.	2.12	Triple Play	
900 ft. x 5 in.	3.49	450 ft. x 3 in.	2.79
1200 ft. x 5¼ in.	4.25	900 ft. x 4 in.	4.19
1800 ft. x 7 in.	5.79	1200 ft. x 4¼ in.	5.85
Double Play		1800 ft. x 5 in.	7.33
300 ft. x 3 in.	1.71	2400 ft. x 5¼ in.	8.63
		3600 ft. x 7 in.	13.31

TRANSISTORS AND DIODES

AC107	$1.90	2N269	$1.40
AC125	85c	2N270	$1.34
AC126	85c	2N279	$1.16
AC127	90c	2N280	$1.54
AC127/128	$1.85	2N281	$1.25
AC127/132	$1.81	2N301	$1.99
AC128	90c	*2N301	$2.25
2-AC128	$1.81	2N301A	$3.30
AC132	85c	2N370	$1.84
2-AC132	$1.72	2N371	$1.84
AC172	$1.00	2N372	$1.14
AD139	$2.10	2N373	$1.40
2-AD139	$4.21	2N374	$1.48
AD149	$2.22	2N406	84c
*AD149	$2.25	2N408	84c
2-AD149	$4.41	2N410	85c
*2 AD149	$4.50	2N412	85c
AF102	$2.00	2N591	90c
AF114N	90c	2N647	90c
AF115N	90c	2N649	90c
AF116N	85c	2N1010	$1.40
AF116NS	85c	2N1637	85c
AF117N	85c	2N1638	85c
AF118	$2.10	2N1639	85c
AF178	$2.00	2N2613	88c
AS128	90c	2N2614	$1.00
BC107	$1.00	AA119	30c
BC108	90c	2-AA119	60c
BC109	$1.30	AS25	60c
BF115	90c	BA100	44c
OC26	$2.55	BA102	$1.22
2-OC26	$5.10	BA114	39c
OC30	$4.00	BA122	30c
2-OC30	$8.00	BY100	$1.30
OC44N	89c	OA90	28c
AC45N	89c	OA91	29c
OC57	$2.22	OA95	33c
OC58	$2.22	OA210	85c
OC59	$2.34	OA605	55c
OC60	$2.40	OA610	60c
OC65	$2.43	OA620	65c
OC66	$1.43	OA630	80c
OC70	$1.16	OA650	$1.05
OC71N	$1.24	OA660	$1.22
OC72	$1.25	OA670	$1.40
2-OC72	$2.50	OA674	80c
OC74N	85c	OA675	50c
2-OC74N	$1.71	1N87A	23c
OC75N	$1.24	1N617	20c
OC79	$1.40	1N618	33c
OC169	$1.83	1N3193	65c
OC170	$1.83	1N3194	85c
OC171	$1.90	1N3195	$1.22
OC975N	$1.71	1N3196	$1.50
2N217	88c	1N3253	72c
2N217S	88c	1N3254	90c
2N218	90c	1N3255	$1.25
2N219	90c	1N3256	$1.55
2N220	90c	1N3563	$1.71
2N247	$2.50		

* Supplied with mounting material

TELEPHONE TYPE PLUGS AND JACKS

Plug shielded cover nickel plated C20-1	72c
Plug insulated phenolic cover C20-3	60c
Plug—shielded cover chrome plated C20-5	50c
Plug insulated phenolic cover C20-6	52c
Plug -brass P.M.G type bk'lite cover No. 150	71c
Jack sockets for above ⅛ in. mtg. bush C20-2	32c
Jack sockets for above ¾ in. mtg. bush C20-4	32c
Plug—miniature telephone type C30-1	36c
Plug miniature telephone BULGIN P519	50c
Plug—miniature telephone BULGIN P529	70c
Jack socket suit C30-1 P518, P529 J30	54c
Plug compact insulated cover BULGIN P38	54c
Plug shielded side entry BULGIN P536	68c
Plug—shielded P.M.G. type BULGIN P538	77c

PLEASE INCLUDE FREIGHT WITH ORDERS

William Willis & Co. Pty. Ltd., 430 Elizabeth St., Melbourne, C.1

TARQUIN TRANSISTOR SPEAKERS

In Sizes 2¾ and 2½ inch

Model	Diam Inch	Imped. Ohm	Power Cap.	Gauss	Price
TR1	2¾	8	0.1w	8500	$2.00
TR2	2¾	15	0.1w	6500	$2.00
TR3	2¾	40	0.1w.		
TR4	2¾*	40	0.1w		$2.72
TR5	2½	8	0.3w	7000	
TR6	2½	15	0.3w.	7000	$2.25
TR7	2½	40	0.3w.	7000	$2.75

(* with 6 BA tapped magnet housing)

ROLA SPEAKERS

Selected range for Communications Receivers, Inter-Com. Systems, Transceivers, etc.

Type 3CQ, 500mw., 3 in. square, voice coil Z 3.5, 8, 15, 27, 47 ohms $3.23

Type 4CQ 3½w., 4 in. square, voice coil Z 3.5 15, 27 ohms $3.35

Type 5CQ, 3½w., 5 in. round, voice coil Z 3.5, 15, 27 ohms $3.52

Type 6H, 6w., 6 in. round, voice coil Z. 15 ohms $4.10

Type 8M, 7w., 6 in. round, voice coil Z 15 ohms $5.38

Type 8H 6w., 8 in. round, voice coil Z 15 ohms $4.70

Type 8M, 10w., 8 in. round, voice coil Z 15 ohms $5.86

Full range of ROLA SPEAKERS available from 2 inch and oval styles to 12 inch high fidelity types.

Speaker Transformers to suit all Speakers. Type "C" 10w.) $1.60; Type "D" (7w.) $2.27 Type "E" 5w.) $1.73.

Wharfedale Goodmans and other imported and local High Fidelity Speakers supplied to order. Prices on application.

VALVE SOCKETS

TELETRON
BAKELITE
MOULDED
AND
MICA
MOULDED
VALVE
SOCKETS
SKIRTED
AND
UNSKIRTED

ST27G	7-pin unskirted bakelite	16 cents
ST27L	7-pin unskirted mica	18 cents
ST29G	9-pin unskirted bakelite	11 cents
ST29I	9-pin unskirted mica	15 cents
ST47G	7-pin skirted bakelite	23 cents
ST47L	7-pin skirted mica	31 cents
ST49G	9-pin skirted bakelite	31 cents
ST49L	9-pin skirted mica	36 cents
ST48G	octal moulded bakelite	10 cents
ST48L	octal mica filled	16 cents

CANS FOR SKIRTED SOCKETS

1-9 16 inch Can Length—	
CS7/1 for 7-pin	15 cents
CS9/1 for 9-pin	22 cents
1-15/16 inch Can Length—	
CS7/2 for 7-pin	15 cents
2 inch Can Length—	
CS9/2 for 9-pin	22 cents
3-3 8 inch Can Length—	
CS7/3 for 7-pin	19 cents
2-3/8 inch Can Length—	
CS9 3 for 9-pin	22 cents
Ceramic 7-pin Skirted Sockets	30 cents
Ceramic 9-pin Skirted Sockets	35 cents
Ceramic Octal, 4-pin, 5-pin, 6-pin standard Valve Sockets	$1 10 ea.

INSTRUMENT DIALS

Cat. No. 596

GEARED SLOW-MOTION DRIVE ASSEMBLY

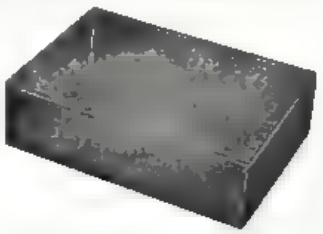
A high grade assembly designed for instrument applications. The movement is gear-driven and fly-wheel loaded, giving a smooth positive drive, with a reduction ratio of 110 to 1. The pointer has a horizontal travel of 7 inches. A circular vernier scale marked over 100 divisions, rotates five times for one traverse of the pointer, and, read with the "100" scale on the dial, provides a total of 500 divisions.

Price $21.75

Cat No. 598

FULL VISION DIAL

The epicyclic, ball-bearing drive mechanism is of improved design and has a reduction ratio of approximately 10 to 1. The movement is smooth and free from backlash. The dial escutcheon measures 6 in. long by 4⅛ in. wide plus a 3/64 in. lip. The scale is marked 0-100 over 180 deg. and is 5 in. across. A large fluted instrument knob is fitted. Ripple black finish. Ideal for a.a.b. equipment. **Price $5.19.**



ALUMINIUM CHASSIS

17 inch	x 12 inch	x 3 inch	$2.75
17 "	x 10 "	x 3 "	$2.57
17 "	x 8 "	x 3 "	$2.35
13 "	x 10 "	x 2½ "	$1.95
13 "	x 7 "	x 2½ "	$1.70
11 "	x 8 "	x 2 "	$1.60
10 "	x 6 "	x 2 "	$1.35
8 "	x 5 "	x 2 "	$0.98
8 "	x 4 "	x 2 "	$0.90
5 "	x 3 "	x 2 "	$0.82

WAFER SWITCHES

Series 20—Earth Return.

Type 20.	1 pole 2 pos.	56c
Type 24.	1 pole 3 pos.	65c

Series 20—Insulated Return

Type 22	2 pole 2 pos.	74c
Type 22	2 pole 2 pos (spring return)	$1.10
Type 23	1 pole 2 pos.	65c
Type 26	3 pole 2 pos.	84c
Type 27	1 pole 3 pos.	74c
Type 28	2 pole 3 pos.	81c

WAFER TYPE "H"

1 pole 11	Position—	1 section	$1.15
		2 section	1.90
		3 section	2.77
1 Pole 12	Position	1 section	1.70
		2 section	2.57
		3 section	3.47
2 Pole 4	Position	1 section	1.10
		2 section	1.89
		3 section	2.65
2 Pole 5	Position	1 section	1.10
		2 section	1.89
		3 section	2.68
2 Pole 6	Position	1 section	1.60
		2 section	2.58
		3 section	3.47
3 Pole 3	Position	1 section	1.10
		2 section	1.89
		3 section	2.68
3 Pole 4	Position—	1 section	1.00
		2 section	2.57
		3 section	3.47
4 Pole 2	Position—	1 section	1.10
		2 section	1.89
		3 section	2.68
4 Pole 3	Position	1 section	1.60
		2 section	2.58
		3 section	3.47
6 Pole 2	Position—	1 section	1.60
		2 section	2.58
		3 section	3.47

(Spindle 2½ in from Bush Face—⅛ in spacing between sections.)

MODULATION TRANSFORMERS

BRITISH "WODEN"

Type No.	Audio Watts	R.F. In Watts	Max. Sec. Current	Price
UM0	10	20	60 mA.	$18.50
UM1	30	60	120 mA.	$10.98
UM2	60	120	200 mA.	$47.68
UM3	120	240	250 mA.	$59.70

NEON LAMPS

GE Type NE51 M.B.C. 110v neon lamps, ¼ watt

GE Type NE2 Pig-tail 110v. neon lamps, ¼ watt 25c

RESISTORS

Cracked Carbon Resistors, 5%, ½w 10c
Cracked Carbon Resistors, 5%, 1w 12c

MAINS TOGGLE SWITCHES

German knife-blade type, self-wiping contact toggle switches

Type APR

1016C single pole changeover	47c
1019C as above with centre "off"	50c
1011C single pole "on-off"	40c
507 two pole "on-off"	69c
509 two pole changeover end contacts	75c
519 two pole ch'geover rear contacts	75c
559 four pole changeover	$2.50
649/2 two pole changeover centre off	$1.00

PUSH BUTTON PANEL SWITCHES

Type APR—

1212C push to break return "on"	60c
1213C push to make return "off"	60c
1316 single pole changeover	$1.80

PLEASE INCLUDE FREIGHT WITH ORDERS

Some Observations on Amateur Radio in Britain and Canada in Comparison with Australia

DAVID WARDLAW, VK3ADW (also G3RYW and VE3CAY)*

FIRSTLY let's look at licensing. In Britain the main licence is the Amateur (Sound) Licence A which allows all normal operating privileges, however, for mobile operation a special mobile licence must be obtained. There is also a special licence for television transmissions. In 1964 a v.h.f. telephony class of licence was introduced, allowing operation on the 430 Mcs. band and up. The licence fee is $5 Australian.

Unless there are exceptional circumstances no call sign is re-issued. The earliest G call signs issued being the G2 followed by two letters. All the post-war licences are in the series G3 followed by three letters for Amateur (Sound) Licence A, G6 followed by three letters for television, and G8 followed by three letters for v.h.f. telephony. Stations operating under the reciprocal licensing agreement use G5 followed by three letters then their own foreign call sign. This does not apply to Australians who, because they are British subjects, can take out a normal station licence.

If you move from one country to another in the British Isles, only the prefix letters change. For example, if G3XYZ goes to live in Scotland he becomes GM3XYZ. There is no duplication of call signs within the British Isles. The GB prefix is used for special activities stations such as exhibitions, v.h.f. beacons, etc.

In Canada the operating privileges available depend on the certificate held by the licensee. The initial certificate, the Amateur Operator's Certificate, allows c.w. only on the high frequency bands with telephony above 50 Mc. After a period of twelve months telephony operation is permitted on the 28 Mcs. band. The advanced Amateur Operator's Certificate requires a further examination after the initial twelve months' operation as an Amateur, the holder being allowed full privileges on all bands. As in the U.S.A., Canada has compulsory telephony sub-bands; fortunately they extend below the U.S. telephony subbands. The power limit in Canada is 750 watts input to the final. The licence costs just over $2A. and is administered by the Department of Transport and not the Post Office as in Britain and Australia.

In Britain wide use is made of the 160 metre band. Unlike Australia, the atmospheric noise on the band is low, and the distances required are not great. This band is shared with trawlers known as fish phone.

The 80 metre band is good for European contacts and also into North America. 40 is just as full of spurious signals as it is here. European short skip can cause bedlam on 20 and accounts for VK signals often not being heard by the G's.

* 21 Tormey St., North Balwyn, E.9, Vic.

There is quite a lot of v.h.f. activity and although there is no 50 Mc. allocation there is a band 600 Kc. wide at 70 Mc.

In Canada the use of the bands is much more like in Australia. U.S. commercial equipment is readily available in Canada but the price is about 20% up because of import duties. The Sweepstakes—a domestic contest very similar to the R.D. Contest—is very popular, having separate weekends for phone and c.w.

The district radio club plays a large part in the life of the average British Amateur. There is a degree of competition between clubs which is fostered by several contests between representative club stations on the 160 metre band (c.w. only).

The main contest of the year in Britain is the National Field Day in which most clubs enter a team. Each entrant is allowed two stations which divide the h.f. bands, taking three each. Not all clubs divide the bands the same way and during the contest this makes estimating the position of rivals a little more difficult. Some of the smaller clubs only enter one station (three bands only). These stations compete for a minor award. There are also awards for the top scoring station on each band. This is a c.w. only contest.

In North America the Field Day is also very popular. All modes are allowed and one transmitter can be used on each band if the club can muster enough, as the telephony sub-bands count as separate bands for the contest. The results are grouped by the number of transmitters used.

In conclusion I would like to say that the travelling Amateur can be certain of getting a great welcome wherever he goes.

Dr. DAVID WARDLAW, VE3ADW

David was first licensed in 1948. He became Victorian Division Federal Councillor in 1955 and held this position until 1958, when he was elected President of the Victorian Division. He relinquished this post in 1962 as he was going overseas for further study. He was in Canada and Great Britain during 1963, 1964 and 1965. In Canada he operated as VE3CAY, and as G3RYW in Britain. On his return he was immediately appointed to Federal Executive, and now maintains a close liaison with overseas societies, especially the R.S.G.B., with whom he was closely associated during his stay in that country. David is a keen operator, and can always be relied on to participate in the N.F.D.

OVERTONE OPERATION OF QUARTZ CRYSTALS

(Continued from Page 8)

ond factor is the greater attention paid to the surface of the quartz discs. Extra lapping is usually carried out with finer abrasive powders to get the two main surfaces of the disc as flat as possible. In the case of fifth overtones even more lapping is carried out on the disc and in the final stage abrasives similar to jewellers' rouge are used. This polishes the quartz to such an extent that it becomes transparent not merely translucent as in the case of third overtones.

The accompanying photograph illustrates this point and also shows how the quartz plate is held between two springs. The "keyhole" shaped electrodes are evaporated onto the quartz in a vacuum chamber, one on each side of the disc with the tails in opposite directions. These plated electrodes take the place of the metal electrode plates in the old FT243 and DC11 style crystals. At frequencies removed from the pole-zeros the crystal looks like a small parallel plate capacitor—4 to 7 pF. in practice—with a quartz dielectric. This makes up the main part of the C, discussed earlier.

The third and final important difference between overtone and fundamental crystals is the material used for the electrode. The general shape and method of mounting is the same in both cases, but third overtones are usually silver plated and fifths are sometimes silver and sometimes aluminium plated. In this country and the U.K. fundamentals are usually gold plated (pure gold too). Some American fundamental crystals may be silver plated from a cost angle. Silver and aluminium are used because of their lower density, but have the disadvantage of tarnishing when exposed to the atmosphere.

There are other differences which will vary from one manufacturer to another and a discussion of these is beyond the scope of this article. Nevertheless it should be quite clear now that there are substantial differences between crystals designed for fundamental and overtone operation and that the Amateur should make up his mind what type he wants to use. The only things he will achieve by trying to get first class performance from rocks not designed for the job is grey hair and stomach ulcers.

To assist the Amateur in making up his mind, Part Two of this article will discuss practical limits on frequency and activity for the various types of crystals, circuit to use and not to use, and a simple method of measuring activity.

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3. "Quartz Crystals as Oscillators and Resonators," by D. Fairweather and R. C. Richards. (Marconi Review Publication.)
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N.B.—References 3 and 4 are now out of print, but good technical libraries should have copies available.

WHAT IS AN AMATEUR?

ALF SEEDSMAN, VK3IE*

A GOOD dictionary will tell you that the word is related to the Latin word "amo," which means —I love.

An Amateur is a friendly person who does things for love—someone who is interested in doing things for a purpose other than personal gain.

For some reason he is regarded by many as a second-rate exponent of art or science, who can be satisfied with the mediocre, because his livelihood does not depend on it.

His results need not possess sales appeal, and his services cannot be commanded by financial pressure.

True, his resources may be limited and certain lines of enquiry may be denied to him; but necessity and invention are closely related. Many simplified techniques have been developed by Amateurs because "classical" methods are too expensive.

The field of electronics is a happy hunting ground. The art of communication is vital to all members of the human race from the cradle to the grave. In its electronic form it is one of the arts, like painting and real music, which can be enjoyed from early youth to old age, by rich or poor. Self-taught people in all arts often excel, and produce results which may stir the envy of some "conventionals" who have "studied" the art seriously, for a livelihood.

The joy of achievement is the chief coin in which an Amateur can be paid. Once he starts thinking—"This is good. It works, and it only cost 'x' dollars. If I make a hundred of these I'll make a fortune"—he is no longer an Amateur. His love of the art is unfaithful. He is more in love with the money. You say this is pointless. If he discovers something, why shouldn't he cash in on it? Very well, let him turn professional. Tennis players do it. They go on playing mighty good tennis thereafter; but not for the Davis Cup. Our limited bands are for Amateurs.

Listening on some Amateur frequencies recently has sounded to me like a session of sales-talks on the virtues of certain brands of ready-made "Amateur" equipment. Are we slipping? I can remember (years ago certainly) when to mention on the air even the brand of valve you were using was just not done.

The other night I gave a wry smile when I heard a loud-mouthed gentleman on twenty say—condescendingly—"Congratulations, O.M., on the sig. your little rig is putting out. My rig is a . . . which, of course, is a more sophisticated version of yours plus a . . . final feeding a . . . beam. It gives me the extra couple of S points which made all the difference in the . . . contest. You've got to have it these days to be in the race."

Now just exactly what is this race? Is it an Amateur event or a professional handicap? A sporting rivalry or a comparison of bank balances?

* 49 Cookson St., Camberwell, E.6, Vic.

I do not use c.w. very often now, but I can see that these c.w. boys have something that is in danger of being lost by other modes. They are artists—some of them, anyway. They take pride in communicating with the minimum of complications. Modulation for them is always 100%, key down to key up. Four tubes are any amount for a transmitter. Brevity is a built-in necessity, or they won't find many who will work with them. There are fewer c.w. snobs than other types, and comparatively few exhibitionists. Their art is the ability to exchange ideas with a distant person by turning a switch on and off according to a recognised pattern of timing. It is behaviour to mutually accepted rules—true civilisation — controlled self-expression. Only occasionally do you hear the "rare one" obliterated during transmission, and rarely is the "butter-in" successful in pushing in, ahead of the queue, when the "rare one" changes over to receive the other station of an established QSO. Good "dog-piles" are fine, however, at the proper time, and good fun.

Good behaviour apparently is more difficult for other modes of transmission. For instance, teletypists have not endeared themselves with the rest of the Amateur fraternity by their methods of "clearing a channel," and then holding it by sending "dits." One finds the same type of manner in a piggery at feeding time.

Pushing in on a phone QSO, without being invited to join in, is not uncommon. The old idea of waiting till the formalities at the end of an over are being observed, and then giving your call sign once with the words "on frequency" or "waiting," is preferable to "doubling" during the course of the "over," without invitation. It is also less likely to result in the other stations moving to another frequency to avoid the QRM.

It adds up to this, in my opinion. If you want people to communicate with you, you must make it worth their trouble. You must constantly keep in mind what is happening at the other end.

ALF SEEDSMAN, VK3IE

Alf is by occupation a civil engineer with the Victorian Railways. Aged 62, he claims the "vital statistics" of 36, 40, 40. He lists 80 mx, 40 mx, 20 mx, s.s.b., d.s.b., a.m. and c.w. as his order of preference. He is very interested in Antarctica, but has never been there. Other DX from the back fence onward is welcome, All Alf's gear is homebrew. He was an early post-war worker on v.h.f., but this side of activities is now left to his son Donald who holds the call VK3ZIE.

The subject that may be interesting to you in great detail, may be just plain boring to the other man. He may not want to hear that you possess an XP326 into a PK517 feeding a a QP24 two hundred feet high. He may not own a Cadillac, yet he may be able to go places you haven't heard of, and have a wealth of knowledge you might find interesting. He could be a boy operating his first contact—very nervous, but getting a marvellous kick out of it. He could be a man on the ice in Antarctica—just a little bit homesick, or a man on a yacht in the Tasman—just a little bit seasick.

Whoever he is he has feelings, opinions, problems technical and private, as well as the same desire to communicate, which brought you into your shack and caused you to turn on that switch.

That is, assuming you are really an Amateur.

If you feel the need for doing a little advertising of some product you are interested in, keep your fingers off that switch. If you touch it for that purpose, I hope it bites you, and that your feet are wet.

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AVOID BECOMING A ROBOT

Most of you are Radio Amateurs—devoted to Amateurism—a term which has many explanations. An excellent statement on this statement—one which really highlights the unselfish view—was published more than ten years ago in a French Amateur Radio magazine. The comments made are no less applicable now than they were then.

The permanent secretary of the Academie of Sciences has affirmed that "The Amateur has a fundamental and indispensable role in all activities." From our point of view in Radio, electronic theory has no meaning unless applied electronics follows. The experiments tried and the experiences considered exist only with the view of immediate application. The results obtained ought, in effect, to be put at the service of humanity as soon as possible.

Whether he be aware of it or not, the individual lives by means of a continual exchange of services with this large family of humanity. If he attempts to isolate himself, he nevertheless profits from the work of others, without giving anything in exchange; he becomes a parasite.

The spectacular aid that the OM performs, sometimes in case of emergency, should not make us forget his permanent and modest utility. This resides in all of his activities, to the extent that he makes them known. One does not expect a flood of brilliant results of him, but rather the gentle stream of news which comes from his patient daily experience. It is in this manner that techniques are perfected and the frontiers of the unknown are slowly pushed back. It is pure egotism to hide in one's station and never communicate one's ideas, schemes, contacts or trials of things. It is also to deprive one's health of the light of that friendly co-operation which makes Amateurism so charming. Thus, your work, experiments and research should be made public at meetings, expositions and at national and international conferences. It is necessary to know the results obtained, even if they are not brilliant. Another OM will know, perhaps, how to use them in a better manner. Do not be too personally occupied and look at the results objectively.

Whether you like the lower frequencies or u.h.f./v.h.f., remote control, antennae, whether you be young or not so-young and more or less a slave of routine, avoid becoming a robot. Think, work, and make your efforts known. It is only under these conditions that Amateurism will develop.

L. Aubrey, F8TM.

(Source: Radio R.E.P., August-September, 1956.)

SIDEBAND

Sub-Editor: PHIL WILLIAMS, VK5NW

GROUNDED GRID INPUT CIRCUITS

To most people the "grounded grid" amplifier is a gloriously simple affair in which the grid, if a triode, or grids, if a pentode or tetrode, are solidly earthed to the chassis, and the drive applied to the heater or cathode through a large capacitor. Bias supplies, screen supplies and that horrible grid tuning may be done away with, but you need plenty of h.t.—so they say—and all your driving power, well almost all, appears as output. Neutrallsation, too, can be forgotten.

Speaking as one who has been through the stage at which "grounded grid" appeared to be the answer, but was found wanting—I now pass on all the pitfalls, difficulties and necessary refinements which must be considered when this type of amplifier input circuit is used.

CHOICE OF TUBES

It is very important to choose the right tubes for your grounded grid stage. From the r.f gain point of view the high slope triodes are good, but the actual construction of the tube should be carefully observed. A zero-bias tube type is a help in eliminating the bias supply.

The simple triode is the simplest tube to use as its grid is usually robust and is designed to take grid current. From the screening point of view, those tubes whose grids are connected to a screening disc between the plate and the cathode are a good choice, as you will find when we come to use the 10 metre band in a year or two. This disc is then brought out of the envelope through about three separate leads through the glass so that a good r.f. ground, having low inductance, is possible.

The Eimac 3-400Z triode is very good from this aspect. It has been designed for this application, and, in addition, requires no grid bias supplies as the quiescent plate current drawn at recommended plate voltage is such as not to exceed the rated plate dissipation.

The popular 811-A tubes used in parallel combinations—two, three or four together—have the desirable features such as high peak emission, low plate-to-cathode capacitance, and zero-bias operation, but the long, single-wire, internal grid lead, which does not provide adequate shielding of the heater leads, necessitates neutralisation at the higher operating frequencies. The grid lead inductance does not permit the effective grounding of the grid. A feedback winding on the heater choke (bifilar choke to supply the heater current) and a neutralising condenser of the usual disc type are necessary and the design of this is "cut and try" on the 10 metre band, as such things are not amenable to calculation.

Some of the continental triodes in the TB series are suitable for grounded grid operation, but stiff bias supplies are usually required. In these days of zener diodes and shunt regulated transistor bias supplies, this is not a difficult problem. The shunt regulated supply should have a standing drain sufficient to back off any change in voltage on the grid, due to the flow of grid current back through the shunt.

Small by-pass capacitors must be used at the tube socket for r.f. grounding of the grid, but any other capacitors on the bias supply should be very carefully chosen, so that grid current will not build up the bias voltage on a condenser. I have heard "linears" on the air suffering badly from this effect and any attempts to explain it usually are not understood.

Many handbook type bias supplies, designed for modulators and class C amplifiers, will not regulate effectively with the reverse current from a linear (r.f.) amplifier. I have frequently had to double the bleed current in the bias supply potentiometer to improve regulation.

CATHODE TUNING AND MATCHING CIRCUITS

In Fig. 1 is shown the recommended method of feeding the cathode input amplifier. The usual method of supplying heater current to the amplifier valves is through a bifilar-wound coil on a half inch diam. ferrite rod about 5" long. In the case of, for example, four 811-As in parallel, the heater supply is 16 amps. at 6.3 volts. The copper necessary to carry this is a winding of double 14 s.w.g. for each lead and even this will get a little warm, so a two-layer coil with two parallel conductors in each layer is used.

Since most cathode input impedances are in excess of 50 ohms and the exciter output is usually 50 ohm cable, it is necessary to use either a pi-network or tapped coil, low Q matching circuit, as shown. A Q of about 2, i.e. low enough to not require re-tuning throughout a band, is usually employed. To achieve this C1 should be between 12 and 20 pF. per metre, then for two or more valves in parallel the higher value is usually chosen to be about 400 pF. on 20 metres.

The tuned circuit, apart from providing a means of matching, eliminates asymmetrical loading on the exciter which, without its "fly-wheel" effect, would result in distortion in the amplifier. This effect is discussed in an article first published in "QST" (August 1961) by Messrs. Orr, Rinando and Sutherland, who are W6SAI, W6KEV and W6UOV, respectively, all from Eimac's. It has been included in the A.R.R.L. "Single Sideband for the Radio Amateur," fourth edition, 1965.

The pi-network in Fig. 1 usually has C1 fixed at the desired value and matching is then carried out by varying C2 and L1. These matching circuits may be fixed for each band and switched. Adjustment is carried out at a fairly high level of excitation, with the reflected wave adjusted to minimum on the bridge. If the tapped tuned circuit is used the same procedure is adopted. The matching will not be perfect throughout the full range of drive, but is most important at high levels of output from the exciter, particularly those having fixed output impedance, i.e. no variable loading capacitor.

Some variation in the tapped tuned circuit coil circuit may be made by winding it with a piece of Pyrotenax mineral insulated cable with a single inner conductor. This may be used to carry the heater supply, thereby eliminating RFC1, the filament choke. This is possible, but construction of a coil from this cable is quite a difficult job and results in a bulky switched grid circuit. Fixing the taps to a coil made

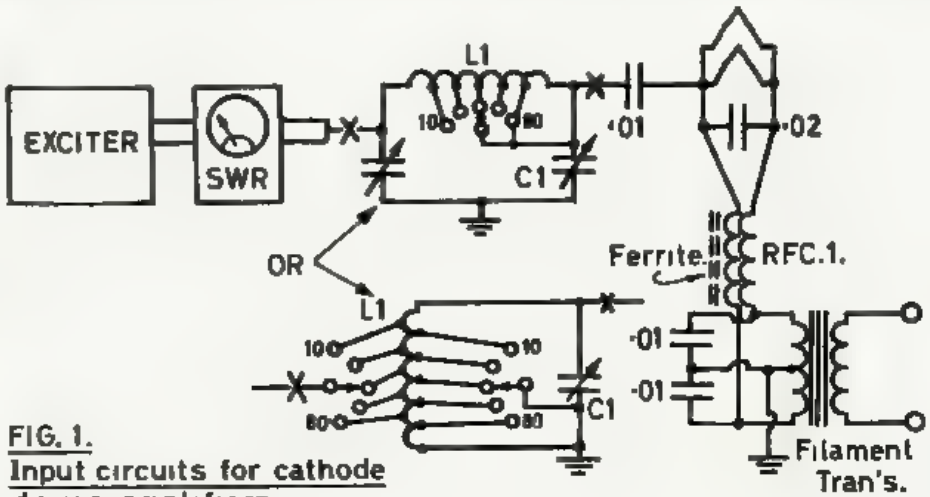

FIG. 1.
Input circuits for cathode driven amplifiers.

of 3/16" o.d. cable, so that it can be bandswitched, is quite a job, I assure you.

VARIATIONS ON CATHODE DRIVE

With multigrid valves it is possible to ground all grids and drive the cathode as stated above, but you can get a shock when you check the grid current. I can remember stopping short in the middle of a sentence on seeing a grid current meter reading 300 mA. at relatively low drive. Putting the normal supply voltage back on the screen and bias on the grid, reduces grid current in a remarkable way, but if, as shown in Fig. 2, the grid is tapped up C1, less drive is applied to the grid and more to the screen.

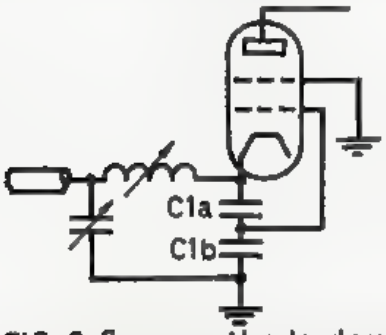

FIG. 2. Super cathode driven tetrode amplifier. (D.C. circuits not shown.)

The advantage of the super-cathode drive is that it can feed through a large amount of drive power if plenty is available, since the drive to the cathode is greater. Input matching is still required, as the input impedance is higher than usual. With some of the larger tetrodes such as the 4-125A and 4-250A, some improvement in linearity is achieved with super-cathode drive. Operation with equal grid and screen currents appears to be common and results in reasonable distribution of the power dissipated by the grids.

The semi-cathode drive shown in Fig. 3 is useful to know about when the exciter is too small to provide the drive required for full grounded-grid operation. But we never seem to get something for nothing, for we are now faced with a complex input circuit, together with the possibility of having to neutralise the stage. With equal drive to cathode and grid (in opposite phase) the driving power fed through is reduced to about half.

A word is in order about the 4X150A and 4CX250B tubes and others similar. It is advisable to operate these in the super-cathode-drive mode to reduce the grid current at full drive, otherwise damage may result. Some d.c. voltage on the screen may be used for the same purpose. About half of the screen voltage for class AB operation is usual.

The operation of some of the big, old tubes like 803s, 810s is quite possible, but you should realise that quite a lot of drive voltage is needed and quite a high plate voltage is needed to obtain reasonable output. However, as soon as we calculate the plate load impedance for operation at 2000 volts or more, the minimum plate capacitance of tube plus strays starts to limit the upper frequency. To work above about 15 Mc. we have to lower the plate volts or use a very high Q (loaded) circuit in the plate, with loss of power gain at low voltage or coil heating at higher Q. Again, a compromise is necessary. The choice is yours.

The 813 will get you to 30 Mc.—but use a tuned input circuit, or your signal will "spread".

73 for now, Phil VK5NN.

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ODE TO A MODE

In days of old when Hams were bold
and Sideband not invented,
Words were passed by pounding Brass
and all were quite contented.
(With apologies to Wm. Shakespeare—or was it PanSy?)

—From "R.S.G.B. Bulletin," October 1966.

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W.I.A.—ITS ADMINISTRATION

(Continued from Page 14)

So let us, by our efficient organisation and tolerance of the other person's point of view; by our respect for the decision of the majority and our appreciation of what the Institute represents in the world of Amateur Radio, seek to attract such men, for the aim of all licensed Amateurs should be directed to the major problem—of ensuring that the world's greatest hobby is protected and maintained for all time.

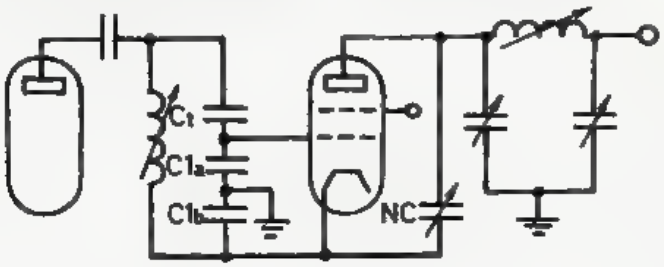

FIG. 3. Semi-cathode driven tetrode amplifier. (D.C. circuits not shown.)

Publications Committee Reports

As at the time of writing the Committee has not had a February meeting, and therefore there is no report available to cover general business.

During the last month correspondence has been received from VKs 5XK, 5ZMG, 6EI, 7LL, H. H. Walker, Canberra Radio Society, T Mayne, Warwick Johnston, "73 Magazine," and F Gould. Technical articles have been received from VKs 2TQ, 2AHI, 2AOU, 2ZDI, 3ZRY and 3ZOM

We are prepared to consider publishing letters addressed to the Editor without disclosing the name of the writer, but unless the writer is prepared to disclose his name to the Committee such letters cannot be accepted as having been written in good faith. Any person wishing to have letters published under a "nom de plume" should send such mail with a covering letter explaining they do not wish to have their own name published.

The February issue was late due to the long holiday period and the fact that we could not arrange the preparation of the issue before the Xmas break due to the work involved in publishing the Call Book

This present issue is a special in so far as the major portion of the material has been provided by members of Federal Executive. Our thanks go to these gentlemen for their ready co-operation with this project, and for the rapidity with which they each prepared their article, especially as they were given only a matter of two or three weeks in which to do it. We trust that members of the Institute will gain a clearer picture of the members of F.E. and an understanding of some of the problems in their work. At the same time members can see for themselves that despite the amount of time they devote to Institute affairs, they manage to spend some time at their hobby.

SUBSCRIPTIONS DUE

All members of the W.I.A. are reminded that annual subscriptions are now due and should be paid promptly to their Divisional Secretary. Non financial members will not receive a copy of "A.R.," and back copies may not be available upon request. To preserve continuity of your files of "A.R.," please pay your annual subscription now.

SWL

Sub-Editor D. GRANTLEY, W1A-L2022
P.O. Box 222, Penrith, N.S.W.

My comment in the last S.w.l. notes in reference to the lack of VK2 notes has brought a prompt answer from former sub-editor, Charles Abernethy, in his capacity as publicity officer for the VK2 S.w.l. group, but he cannot pass to me that which is not passed to him, so chaps, when you appoint a publicity officer (and I assure you it won't be Charles) this year, make sure that he is aware that this page in "A.R." is open for his reports. QTH for letters is at the top of this page, and I can be reached at Penrith 2-0680 during working days.

OVERSEAS LISTENERS

Arthur Borradaile is a master sergeant in the U.S. Air Force stationed at their base in Biloxi, Miss. Art has just returned to W5 after a 2½-year stay in DL, this being preceded by 18 months on Okinawa, and several on Taiwan. His QTH is sufficiently good for an indoor antenna to perform adequately. Receivers are Grundig TR-8000 solid state, Hallicrafter S-38c, Telefunken 5468MX, and Blaupunkt Derby for portable or mobile work.

AROUND THE SHACKS

Harry Major L3103 and Mrs. Major left Melbourne in February for a trip through England and Europe. Harry has asked me to advise that his query service will be suspended until his return.

Peter Drew has finished his leave, and is now down at Balcombe in VK3. Over 80 cards were waiting him on his return to VK6, HC1MX, HV1CN, LU1ES and 6Y5MJ being new confirmations, taking him to 197 confirmed. Others of an interesting nature were ZL5AA, 8J1BA, 5Z4JD, YN1FF, YO4SI, VP1LB and UP2NM. Over the Christmas period 10 metres was open to HB, UV, OE, DL, SM, G, UB5, OD5 UA6, I, OH and OK. Fifteen also provided some good DX around 1400z.

Our prominent DX man, Frank 2QL recently contacted a W2 on 21 at 11.45 p.m. EAST, following which they QSY'd to 28, then in succession to 3.5, 7 and 14 making contact on all h.f. bands within the hour, presumably on c.w. At L2022 there is little to report in the way of DX, but did manage to log CR6LJ, 5A2TV, 8V0WU, TR8AH, WB3VJD/CE0A and W0GTA/8F4 on 20 metres. Cards received included CR6EI, EA8FE, FK8AC, G3AAM, G3ID, KS6BR, 7Z3AB, OK3QN, 9Q5IG, VQ4BJ, WA7DNB, XW8BS. In December I acquired a 6 metre rx, built a power supply for same, and spent much of January searching that band. Unfortunately I had no beam, and was forced to use my long wire which runs east to west, also another running N./S. Locals were logged up to 31st December, when a pile of VKs came in, followed on new year's day by a fantastic signal from 4ZW1B in Dalby, 7ZAH in Ulverstone, 5ZBR, 3UT, 2ZGX/M, an unidentified VK6 (sounded like 6LK/P), and carrier only from ZL1AKY who was in contact with 5ZBR, the latter being 5, 6/9 with much QSB.

Since writing the foregoing, QSLs have been received from Jack W2CTN for the W0GTA/8F4 operation on both 15 and 20, also KR6JZ. A further confirmation has taken Mac Hilliard to 99 confirmed with 250 countries heard. Tony Wege L5073 has just acquired a new rx. Best loggings on 20 metres were OX3, 6O1, 7Q7, CR6, 5V, HI8, ZD9, EP3, VR6, ZK1, EL2, 5A3, with 9H1 being heard on 15. Inward cards were received from VE1AFY, HS1CB, KI3C, KG6IJ, XW8CA, XW8BS, DL1MM. Whilst in VK5 we have a letter from Ernie Luff. Many listings were made on 20, among them UM8YZ, OA8, XW8, ZS1, DL, VK0CR, VP2GIA, SP, YA1FW, OX3 and VP8. EA4JG was logged on 15. Of interest are the QSLs received: ET3AC, K4WMB, UW4HZ, W4LRN, F3KW, VE7AHX, II1RCD, DL3KC/M, ZS6AIM, KS6NV, EP2BQ, VE7ZD, these being all on 20, whilst several VK5s QSL'd for both 6 and 160 metre reports. Ernie now has a score of 193/130 with an application lodged for the W.I.A. S.W.L. D.X.C.C.

It is always a pleasure to hear from our No. 1 S.w.l., Eric L3042, whose duties with QSL bureau must give him little time for listening. Using 40 metres Eric logged DL, G, F, I, LZ, OK, SP, UA1, UA0, UB, UI8DA, VU2FN (Eric's first VU on 40), YO, YU and 4Z4NAB. 20 metres produced the following: CT3AS, FB8ZZ, HL9TH, IS1GF, UA1KEO, VP1VR, VR4CR, YJ8BW, ZS6JK, 4S7EC, 5A2TV, 7X0AH, 9E3USA and 9X5MH. Inward QSLs: EP2BQ, HK5CR, KX6DR, 6O6BW, KX6ER, PY1BYK/7, PY2BJH, UM8KAA, VK4DU/MM plus cards from G, DM, HA, J, OK, UB, UC, UP, UR, VE, VK, W and ZL. Statistics given by Eric are always interesting and this batch is no exception. Total scores: 200 heard, 293 confirmed. For 1966, 145 heard from 36 zones, inward QSLs: 108 countries 38z, a total of 608 cards, with 1337 reports sent out for the year. Total log entries to end of year, 307,319. Highest number of cards for the 20 years 1946 to 1966, 226 from G, 896 from Germany, 543 from UA1, 453 from W, and 336 from UA9/0.

Finally, a letter from Bob Halligan L3220. Inward cards of late were VU2RU, XW8BJ, OE3EGL, ZB2AJ, IS1SCB, ZF1GC, YS1AG, KR6MM, YK1AA, 9J2MM, giving Bob a confirmation figure of 105, from 161 heard.

Before closing this section I must congratulate the VK3 group for the job they have done in pruning the S.w.l. list in the new Call Book. How about it VK2?

TAPE RECORDING

Many S.w.l.s throughout the world use the medium of tape to make contact with each other, and some very fine friendships have resulted from its use. I personally have regular contacts with a number of I.S.W.L. members throughout the world, and I feel sure that s.w.l.s here in Australia will be interested to know that the well-known Newark News Radio Club have discussed re-forming their tape section, and if this is done members and participants will benefit greatly. Bob Fowler WB2VUY has asked me to bring this before our VK tape fans, and if any of you are interested in this proposed tape club, you can let me know, or drop a line to Bob at 155 Baldwin St., Bloomfield, New Jersey, 07003, U.S.A.

AWARDS

Among the more interesting awards we find listed is the Robin Hood award, the purpose being to commemorate the doings of Robin Hood and his merry men, who wandered the Sherwood Forest. Sponsored by the Newark Short Wave Club, Newark, Nottinghamshire, U.K., the award is available to both s.w.l.s and licensed Amateurs. There are three Robin Hoods, G3TWV, MP4TBO and ZL3QH/G3UYJ, and twelve merry men, G3s UXF, UVT, KVP, UYU, TWX, OWR, UEB, SLZ, ELJ, EVG, OEV and DJL. To be eligible you must have QSLs from one Robin Hood, and at least five of the merry men, special stickers available for single band operation, all contacts to be since 1st January, 1966, and applications with log data and five IRCs to Award trustee, Francis G3TWV. Interesting, but not really easy.

QSL LADDER

Scores to date for those with over 100 confirmed are Eric Trebilcock 299/293, Bryan Prosser 263/243, Peter Drew 265/197, Don Grantley 303/154, Warwick Smith 214/151, Ernie Luff 193/120, Afton Westcott 158/106, Bob Halligan 161/105, Ray Kearny 176/104, Greg Earl 158/103, and a late letter from Mac Hilliard back from holidays with a card waiting from VQ8AX giving him 280/100.

Notes have been rather light this month, due to non-arrival of DX news from overseas, and the holiday period. Best of luck to all entrants in the John Moyle field day event, and good DX to you all. 73, de Don L2022.

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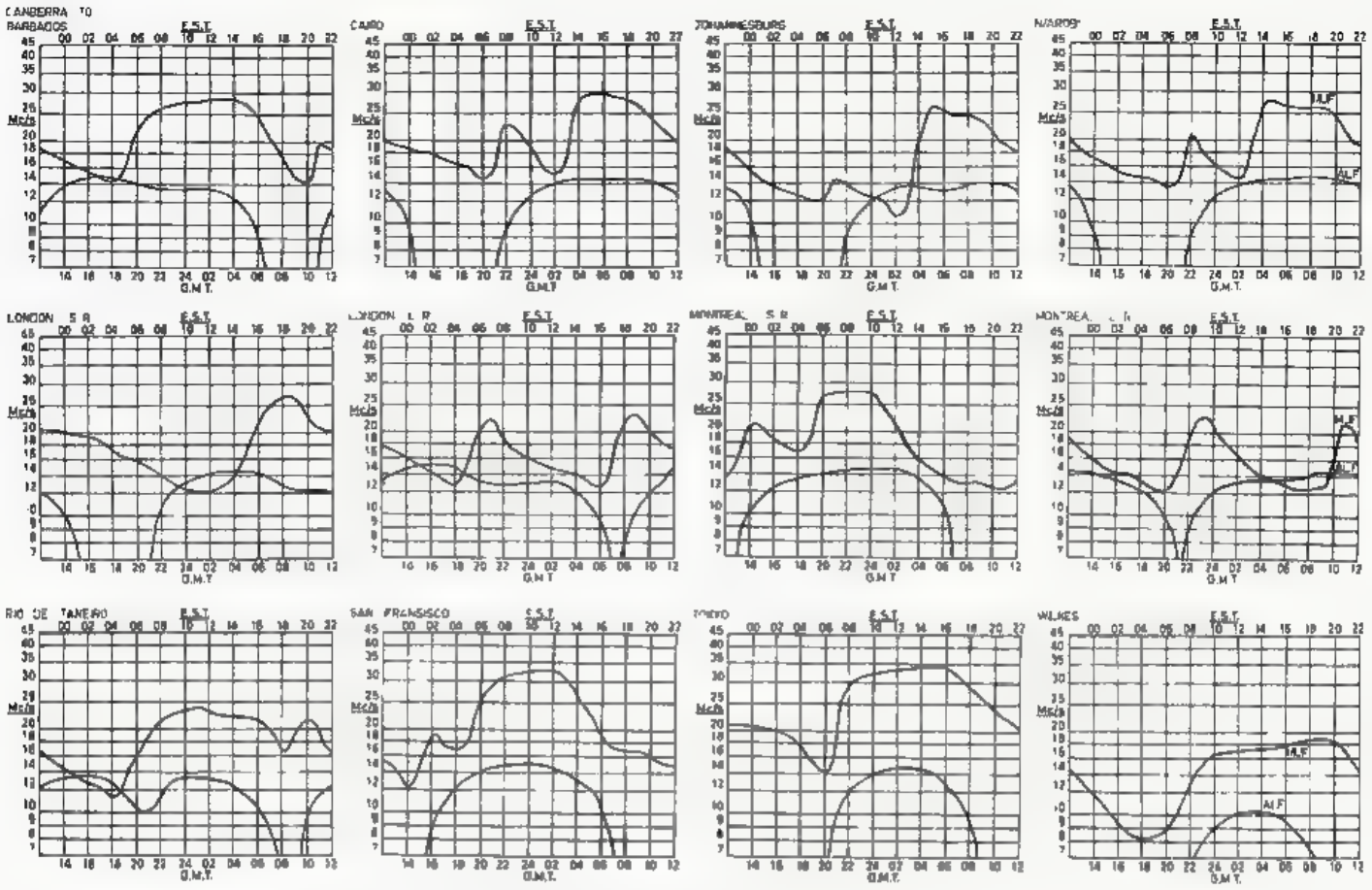
CONTEST CALENDAR

4/5 March: 33rd A.R.R.L. International DX Competition (phone), 2nd week-end.
11/12 March: Thirtieth B.E.R.U. Contest (c.w. only).
18/19 March: 33rd A.R.R.L. International DX Competition (c.w.), 2nd week-end.
29/30 April: P.A.C.C. Contest 1967 (V.E.R.O.N.).
8/9 July: R.S.G.B. 108 Mcs. "Summer" Contest.

PREDICTION CHARTS FOR MARCH 1967



(Prediction Charts by courtesy of Ionospheric Prediction Service)

DX

Sub-Editor: ALAN SHAWSMITH, VK4SS
38 Whynot St. West End, Brisbane, Qld.

Several letters were received this month, both local and overseas, reporting openings on 10 mx. KV4CI in the Virgin Is. has been working VK/ZL around 1130z. CT3AS also says he is hearing Oceania about this time or earlier from 0700z. Some East Coast W's have noted occasional openings. Local information says that 28 Mcs. has been open to U.S.A. at times during the day and VK4DV reports QSO-ing Europeans around 0750z. The few times I have listened there has been an odd very weak signal from the States around 0000z. So there are signs of life where previously nothing stirred. The back-room boys do not paint an over-optimistic picture for this band during the next sunspot maximum during 1968, but like the boy scouts methinks it is best to be prepared and gratefully accept what the fickle goddess of h.f. communication the Ionosphere, may care to bestow. So have you added those extra elements to your quad or yagi yet?

NOTES AND NEWS

Nauru: VK3AHI/8 will be QRV from here by the time you receive this. Mode s.s.b.

Lord Howe Is.: Arie VK2AVA expects to be active during May. Mode s.s.b.

French Oceania: FO8BL on 14,078 0730z. QSL Box 45, Papeete, Tahiti.

Easter Island: Reports still coming through that WB2VJD/CE0 is on daily 21,350 and 14,960. 2300 and 0600z. QSL K5GOT

Tunisia Joe 3V8AZ, 14,110 Kcs. asking QSLs be sent via W8BBE (LIDXA

Iceland: TF2WKE each day, 20,330 s.s.b., 1600z (LIDXA) Also TF2AU 14,050 2000z.

Afghanistan Wolf YA5RG 14,230, 1300z. QSL DL6ME LIDXA) YA1FB 14,200 1200z.

New Hebrides: Bill YJ8BW says he will be on the island 2½ years. Works c.w. mostly all bands. Some s.s.b. Expects to have s.s.b. soon. Best time for him is 1700z or later. QSL via Postmaster Port Vila.

East Malaysia: Ron 9M6RS, 14,030, 1200z.

Turkey: TA2AC worked here 14,030 1700z. QSL K4AMC

Greenland: OX5BU, 14,030 2000z. Coming in strongly over North Pole. Big echo on sig. Seems very active. QTH Thule.

St. Helena: ZD7IF workable here at 1930z around 14,025. Also heard weakly on 7 Mcs. occasionally at 0700z. QSL R.S.G.B.

Macquarie Is.: Rod VK0CR on every chance he gets. 14,070, 14,180 0800z and 1030z. QSL Greg Johnston, 3 Inglis St., Newtown, Hobart.

Guinea: CR5KD, 14,078 and 21,235 a.m. (Fla. DX'er.)

Norfolk Is.: VK2BRJ/8 will be here for two months. Mainly c.w. 7, 14, 21, 28. On every day. He is W4CHA is going next to Nauru if possible. QSL W4ECI Also active from Norfolk is Ray VK0RH.

Kermadecs: ZL1AI still active 14,150 a.m. but will QSO any mode on the fq.

Zone 23: UA0YD, 14,001 1045z and UA0YP, 14,105 s.s.b. at 1030z. (Fla. DX'er.)

West Carolines KC6CK, 14,250 0830z. **East Carolines,** KC6CL, 0830z, 14,225 (Fla. DX'er.)

Iran EP2AX QSL K4OEI ,EP2BQ, P.O. Box 1066 Teheran. Both active 14 s.s.b. 1300z.

Canton Is.: KB6CZ, 14 c.w. 0700z or later QSL K4MQG

Brunei VS5BS, 14 c.w., 1300z.

Qatar: Bill OD5EL reports that he is now licensed as MP4QBU and plans to DXpedite here with Bob OD5BZ about two months from now. (LIDXA)

Gabon Guy TR8AH has been fairly active on 14 Mcs. c.w. 14,030 and 14,055 at 20-2200 GMT QSL via Box 3122, Libreville, Gabon Rep. (LIDXA)

Ivory Coast Dave 5U7AK is on every Tues. and Fri. 14,230 at 1900 GMT, with W8JKY and W8KYY acting as emcees. Fred 5U7AL has been on 14,194 at 2200 GMT, listening 14,205 and asks QSLs via Box 201 Niamey (LIDXA)

Saudi Arabia 7Z3AB is on 14,190 at 1400 G.M.T. listening as directed, almost daily. HZ3TYQ Vic Crawford is now operating 7007 and 3505 c.w. at about 1230 daily (LIDXA)

Rio Di Oro: Justo EA9EJ continues his sporadic activity on 21,190 and 21,210 Kcs. a.m. at 1900 GMT listening occasionally above 21,250. A knowledge of his Spanish is helpful. QSL via Box 21 Villa Cisneros, Rio De Oro. (LIDXA)

Cook Is.: Trevor ZK1AR is active most days at 0300 GMT on 14,170 a.m., and is awaiting arrival of his beam and s.s.b. rig. (LIDXA)

Tchad Republic Serge TT8AB has been on 21,355 Kcs. a.m. at 1900 GMT with excellent signals. QSL via Box 401, Ft. Lamy, Chad. (LIDXA)

Andamans: VU2DIA Hegde on 20 c.w. at 1033z, 14,025 Kcs. (ZL1HV)

Gibraltar: ZB2AM Mike on 20 mx c.w., 0820z. Mike will be operating /MM in Aug./Sep., after which he will be G3JFF. When he leaves the Rock, only about one ZB8 left. (ZL1HV)

Malawi 7Q7GB, 7Q7EC, both regularly on 14 c.w., 1930z, around 14,003 and 14,028 respectively.

Gambia. ZD3G will be here for 1 year. 14,280, 2000z. QSL K6ENX.

Thailand HS3NT on 21 Mcs. 1100z.

Yemen. 4W1K, 14,130 Kcs. 1900z. QSL HB9AAT.

Cote D'Ivoire: TU2AY, 21 s.s.b. QSL Box 20,194. Abidjan.

ACTIVITIES

Dud VK4MY really has been among the good ones this month. He worked on 14 s.s.b. the following: PO8BQ 14,110, VP8DC 14,124, VK9XI 14,219, ZF1GC 14,144. QSL VE4DQ, VK9RH 14,148, VP8FU 14,114, VP6EW 14,120, WB2VJD/CE0, EP2AM 14,235, XW8BS 14,222, 9M2FK 14,121, 6Y5VV 14,161, PJ2AQ, KP4BCL 14,233, VP8GK 14.125, PJ5CE 14,130, ZC4CI 14,208, VR1C 14.185, KX6FH 14,215, 7Q7PB 14,118, 9Q6HF 14,118, VP5RB 14,107, VQ9EF 14,101 Seychelles, VK0CR 14,180. Also [illegible] few on c.w. KX6ER 14,050. KS6CG 14,040, FK8BI 14,010, JH1ABJ 21,057. Dud reports as active the following: VQ9AR 14,138, 6Y5MJ 14,120, VR6TC 14,170, HS4AK 14,121, VP2AA 14,140, 9Q5SH 14,235, 9U5BB 14,140, TR8AG 14,140, 9E3USA 14,040, UF6KBA 14,050, EL2BK 14,040, FO8BL 14,040, JT1AJ 14,050, HM1BW 21,051. All the above during early morning or afternoon.

(Thanks, O.M. Keep up the good work.)

Henry VK6HA writes from Darwin, N.T., and says DX is improving, particularly on 14 and 21 Mcs. He lists the following as QSO'd mostly between 0700 and 1200z. 20 mx: FR7ZD, UI8MF, UL7GW, UQ2HQ, UT5HP, UA3UH, FB8ZZ, FB8XX, LZ1KPW, ZS5BA, CR9AH, CR7HC 5Z4SS, DJ9GD, MP4BGH 5R8CQ, 9J2BC, UB5XA UC2DN, YO6FZ, OK1KDT, 9J2AB. UV3BC/M, HK7YB, HA7PJ and others. On 15 mx EP2RV, OZ4H, 8M6BDW OH1XX, HM1BB. HP1RF, 9J2WR, UA0KZD, F9OB, HA4KYB, DJ6QW, ZE4JS, I1CUV, G3TOK, VR2DK, F6LD, MP4BDF, OH2AA, UI8AP, DL8AV, 5P7HX, UP2UK, ZS1OU, MP4MAW, LA8LG, EI5F, UC2KCB, 4X4CJ, GM3OLK, UH8AA. OD5EJ VQ9AR. LZ1FP, G6XL, ZE1BO

(Thanks Henry. Please write again, old boy.)

Pete VK5PJ reports conditions on 10 and 15 mx as down on the previous month. On 28 s.s.b. he QSO'd DJ8JI, DJ6ZX, 9M2NF, MP4BBW, 7X0AH, YO9CN, JA3ICV, DL1TV, VS6FS, UN8AE, 9M2LO. On 21 Mcs.: YA1BW, DJ8BW G3BHW G5FI, YA1FV, F9XP, FR7ZB, 4X4BL, OZ3KE G6XP, OE3PZW, G6XN, G3IWV, G3JAF, G3LB, 9M2DQ, VS6FD, KZ5NF, HS1CB, LZ1FO, DJ3LF, etc On 14 Mcs CT1PQ, I1VIE, VP7DL, YS1AG, HI8SCE, FW8RC, HR1JAP, 9Q5HO, HR1CN, XE1NE, 6Y5MJ, ZF1GC, YU5CFA, YS1DHE, CP5BK, 5Z4JW, 3C3FHD, VQ8AX. 4S7NE, VS9ALV, VP5AB, CE8EQ. 9J2WR. CR6CY DU1BF, 5Z4JH, YS2BB, CP1PK HK3AFB, VE8QG/SU, 7Q7PBD 6O1AU, YK1AA 9Q5SS, 9M6MG 3W8D, U5ARTEK, 9X5MW 5U7AL, 9G1JM, GM8SV, UQ2KFQ, VP7NA. HR1KAS, PJ4AC, VS6MH, KW8BD and many, many more.

(Really a nice list, Peter, O.M.)

Merv VK4DV writes from north Queensland to report on conditions. 10 mx is open at times through the day at JA and EU and some prefixes have been worked. However, Merv, says that 21 Mcs. has been the best with signals coming through about 0645z. Lots of EUs were worked, such as G, GC, GI, GD, CT, OH and 3C3FJZ/SU Egypt.

(Thanks information O.M., please let's have some more.—AL)

Yours truly, VK4SS, managed these on QRP on c.w. 7 Mcs.: CT3AS, GC4LI, UA3KAH, OH5UP ZD7IP VO1FB. On 20 mx VK2BRJ/8 Norfolk. 9J2BC, 4Z4AG 4Z4HQ, 9X5PB, 9X5NSA 9X5NW, VP2GLE Grenada, VP2MR Montserrat. 3C7KZ., CT3AS. VQ9AA, 7Q7EC Malawi YJ8BW, CO2DR, VS9HRV Kuria Muria 5A2TV, YS1DHE, 8O6BW, VQ9AR, VU2WNV Laccadives, VP1VR Br Honduras, VS9MB Maldive, ZD7IP St. Helena, VP5PJ Barbados.

Ken VK3TL, whose ear for DX seems as sharp as a pointed dog for game, nosed out these juicy ones. Worked on 14 Mcs. c.w./s.s.b., CR5SP Sao Thome, CR7CI, K8OXV/CE0, EP2AM, HI8XJG, HV3SJ, IS1GF, TI2JIC Cocos, TU2BA, VJ2KM St. Kitts, VP5RB, VS9HRV K. Muria, VQ9EF, VQ9AA/C Chagos, VU2WNV Laccadives, VK2AIF/XV5, YA5RG, YK1AA, 5Z4JH, 9X5PS, 9U5BB. Best QSLs received, TU2BA, CR5SP, OH0NF, CR7GF, VP1WH, TK0AH, FY7YM, GM4FM, LX2UW, 5A3TT, 5A4TR, K1NEI(VT), WB2VJD/CE0, PJ3MI.

QTH's

By courtesy Ken VK3TL:
TU2BA—Box 172, Abidjan, Ivory Coast.
TI9JIC— C/o TI2JIC.
HV3SJ Box 9048, Rome.
VP2KM Box 153, St. Kitts,
VQ9EF -Box 191, Victoria, Mahe.
VA5RG—DL6ME.
CR5SP—S.A.C. Ilha, De S. Tome.

SUMMARY

According to information received from A.R.R.L. Headquarters, "3W8D has not been approved for contact by U.S. Amateurs. Some have QSO'd this station and he maintains he is legitimate. Some are running traffic for him. Since the F.C.C. has made no mention of this station he is still on the banned list as far as we are concerned."

Ebon Atoll HC8E and Cormoran Reef are areas that are not part of the U.N. Trust Territory and as a result are under the administration of the U.S.A. As such they do not meet the criteria of separate countries and are therefore removed from the DXCC list. (By courtesy of the Fla. DX'er.)

It is rumoured that when Don W9WNV returns to the U.S.A. he will put his case for the retention of the above Atoll and Reef and maybe one or two other doubtfuls. One can only hope he has the same ability in persuasiveness as he does with his operating.

My thanks to the regulars who support the column more than they imagine, VK3TL, VK4DY, VK4UC, VK4PJ also to VK4DV and VK8HA. Please more news.

73, Al VK4SS.

AMATEUR FREQUENCIES:

USE THEM OR LOSE THEM!

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK3MS	314/325	VK3JZ	282/277
VK3AHO	313/325	VK4HR	281/277
VK6RU	301/324	VK3TL	254/268
VK5AB	300/314	VK2AAK	233/237
VK6MK	296/315	VK2APK	236/229
VK4FJ	275/282	VK3ADE	223/237

New Member.
VK4HA 100/104

Amendments:

VK4KS	134/138	VK4PX	130/131

C.W.

VK3KS	319/342	VK2AGH	279/292
VK3QL	295/315	VK3NC	256/286
VK2ADE	291/313	VK3ARX	251/259
VK3CX	291/313	VK6RU	251/272
VK4FJ	287/309	VK3XB	249/282
VK3AHQ	281/293	VK3TL	245/249

New Members

VK3QK	121/121	VK4SN	100/104

Amendments:

VK3APK	244/251	VK3AXK	205/218
VK3RJ	239/246	VK4KS	101/106

DX

VK3AGH	308/328	VK2EO	285/306
VK3ADE	305/329	VK4HR	278/301
VK6RU	305/328	VK3ACX	276/300
VK6MK	300/317	VK3JA	272/290
VK4FJ	293/315	VK3TL	272/276
VK3VN	291/306	VK3ARX	270/278

Amendments:

VK3APK	261/268	VK4PX	166/171
VK6KS	134/201	VK4CK	109/110
	VK4SN	104/110	

YRS

By the look of the amount of correspondence received so far this column will grow and grow. I hope to receive news from all States regularly to be able to make a separate item for each State so any news about successes in the various certificates, etc., will be very welcome—by the last Wednesday of each month please.

A very attractive Y.R.S. lapel badge has been designed by Howard Rider VK3ZJY is on order, and will shortly be available for the very small sum of 50 cents. This is a wonderful way for boys to find out who is interested in radio.

Radio Instructor's Certificates are available for Club and Postal Group Leaders who contribute so much to the instruction of young people. Conditions for this award may be obtained by writing to Mr. Roger Davis VK1RD, 14 Hovea Street, O'Connor, A.C.T. (Form YRS/9) Please enclose a S.A.S.E. plus eight cents to cover cost. There are many leaders who give a big slice of their valuable time to the Y.R.S. and do not realise their own worth. Please contact Roger to find out more about this.

Incentive Packet System will be continued in 1967 at least for N.S.W. at the moment. Y.R.S. members who gain any Certificate or award are eligible and the list is as follows: Elementary—1 packet, Junior—2, Intermediate—3, Senior—4, Advanced—5, Radio Telephone and Wireless Telegraphy Certificates (Grade 3)—1 packet, Grade 2—2, Grade 1—3. Each packet is worth about two dollars and contains the appropriate parts for the various stages. To claim these packets, Club and Postal Group leaders should write to Mr. C. L. Matthews, 4 Potts Street, Kingsgrove, giving him complete details—name and address of each successful candidate, awards gained, Certificate Registration numbers, number of packets claimed and eight cents worth of stamps for EACH packet claimed.

Data Sheets: The Victoria Y.R.S. is introducing a very valuable system of data sheets comprising details of constructional projects which Club and Postal Group leaders have found practicable. These are very clearly set out and are worth having. They also set a standard for all members. Information on these can be obtained from Mr. Howard Rider, 233 Cumberland Rd., Pascoe Vale, Vic. A similar system is run by one or two leaders in N.S.W. and this is a case when comparing notes could be advantageous, for it would be a shame to duplicate this labour.

A.W.V. Transistors: Supplies of these have been distributed to Y.R.S. Supervisors in all States thanks to Mr. Schonrock. These are in the form of "Multiflash" cards produced for a Science Exhibition in 1965. Mr. Schonrock and A.W.V. have been strong supporters of Y.R.S. for several years and their kind donations have been a real help in the constructional activities of the Youth Radio Scheme.

Registration of Y.R.S. Clubs in 1967 (N.S.W.): Clubs applying for registration or re-registration for the 1967 session must pay a small registration fee of two dollars to cover administrative costs which have mounted astronomically because of the numerous services available to clubs. This can be paid in one sum or in two instalments depending on the "condition" of the club, the first being payable at registration and the second by 1st July, 1967. Clubs which are unfinancial will not be able to benefit from the packet system or enter candidates for contests, etc. Fees must be paid by cheque made payable to Wireless Institute of Australia (N.S.W.) to be sent with the letter requesting registration to Mr. Don Craig, Y.R.S. Registrar, Sydney Grammar School, College Street, Sydney.

CLUB NEWS

A.C.T.-VK1—Peter Gross, of Kogarah, a member of Roger Davis' VK1RD Postal Group, is the first Y.R.S. member to gain the Elementary Certificate in 1967. He gained 98% and therefore will receive an O.T.C. Prize and an incentive parcel. Peter also won the prize for the best notebook. Stephen Mudge, of this same group, won the prize for being the most consistent member. Stephen is helping to promote Y.R.S. interests in his school club at Mt. Colah, N.S.W. Roger is having tremendous success with his members in Canberra and is to be congratulated as he is very short of time because of studies, club duties and now week-end military activities. Susan Brown, VK2BSB, looked after his postal group correspondence during this time and no doubt had to burn a bit of midnight oil to get everything done, including that for her own Postal Group.

In Roger's Monthly Bulletin he has a section for written articles by his members on any suitable project they have constructed and got to work. He also has listed some suggestions on running a school club which should be of interest.

New South Wales, VK2—Peter Cairns, of Kogarah, a member of Bruce Mitchell's Group, has gained the L.A.O.C.P. and is operating under the call sign of VK2ZXB. Peter is a first year Trainee Technician with the Overseas Telecommunications Commission and by this success has been presented with a Book Prize, donated by the Commission. Ray Carpenter, of Westlakes Radio Club run by Keith Howard VK2AKX, has also gained the L.A.O.C.P. and has received an O.T.C. Book Prize.

Ian Hirst, of Sydney, and Jil Trewhella, of Gosford, daughter of John VK2RF, both gained credits for the Junior Certificate. Ian and Jil were both Postal Group members and are to be congratulated for such good work. They are both intending to proceed with the Intermediate. Jil is the second girl in N.S.W. to gain the Junior. Punchbowl High School Radio Club suffered considerable loss, including two soldering irons, from a burglary committed over the holidays. Consequently the club was very glad to receive a quantity of radio parts donated by Mr. Frank Hine VK3QL which helped to compensate for the losses. It might be an idea for club leaders to look into the details for insuring against loss by fire and theft, especially if there is much gear on hand. It may not be too expensive and will set your mind at rest.

Victoria, VK3—Collingwood Technical School Radio Club is continuing to flourish under the leadership of Bruce Johnstone with an increasing membership. Bruce took over from Harry Major, who had been leader for ten years before having to relinquish this job because of pressing duties as vice-principal of the school.

South Australia, VK5—Mr Robert Guthberlet advises that the very worthy project of Y.R.S. aid to paraplegics at Northfield and Royal Adelaide Hospitals is to be undertaken. This is a splendid idea and is certainly one which should catch on as the hobby of radio has tremendous therapeutic value. The Rotary Club of Christies Beach were very interested in a talk on Y.R.S. by Mr Guthberlet. This all helps to spread the good word and among Rotarians there are many licensed Hams who know the value of this work.

Bert Hollebon VK5EQ has been appointed to set the examination papers for the Junior and Elementary papers. These will include 40% multiple choice and 60% conventional type questions. For further information please contact Bert at 26 Nelson St., Port Pirie, S.A.

Western Australia, VK6—I hear by the grapevine that there have been several Y.R.S. members successful in the A.O.C.P. It would be appreciated if you would send me full details.

Please send news to reach me by the last Wednesday of each month. Full address Mrs. Mona Swinton VK2AXS, P.O. Box 1, Kulnura, N.S.W. It seems Kulnura does not appear on the road maps. However, it exists as a citrus growing district approximately half-way between Sydney and Newcastle and 25 miles west of Gosford.

73s, Mona VK2AXS.

VHF

Sub-Editor: CYRIL MAUDE, VK3ZCK
2 Clarendon St., Avondale Heights, W.2, Vic.

Well, by the time you all read this most, if not all of the summer v.h.f. activities will be over. I hope that all of you that were heard exchanging cyphers in the Ross Hull Memorial V H F Contest sent in your logs, not forgetting of course the John Moyle National Field Day logs as well. Just before I close please remember that I must have all copy for this page by the 28th of the month, otherwise it will not be in "A.R" Also please TYPE or PRINT CLEARLY all copy. 73, Cyril VK3ZCK.

P.S.—Owing to space limitation in this issue, and other reasons, some of the Interstate notes have been greatly reduced in size.—VK3ZCK.

NEW SOUTH WALES

The only big event of the month was the New Year Field Day. There were many stations active, some very long distances were worked, but until logs have been checked, the longest distance worked won't be known.

The Annual General Meeting of the Group will be held in April. Members who feel they may be able to help run the group and are prepared to offer their services should do so.

However, there is quite a bit of work to be done—even if rumour has it that committee life is an easy existence. All the knowhows and experts never seem willing to take it on, although they prefer to criticise the work that others so graciously partake. 73, Stephen VK2ZSK.

HUNTER BRANCH

144 Mc.—Some fair openings to Sydney have been had over the Christmas period. Some of the boys have spent a lot of time chasing the 6 metre DX, and have not been heard much on the 144 Mc. band.

The New Year Field Day Contest was rather a wash-out as no great distances were worked and as far as this Hunter Branch was concerned conditions were poor and only a few stations were heard.

52 Mc.—The DX Season is nearly over, and the "Weird Mob" on 52 Mc. have been among the DX. Some of the best openings were on December 10, 16, 28, 29, 31 and January 1, 2 and 3, the best opening was on January 1, when all states were heard or worked including ZL Land. The band has quietened down since the Ross Hull Contest finished. 73, Mac VK2MO

VICTORIA

During the Christmas period some excellent DX has been worked on both 6 and 2 metres. The best 2 metre DX being between Birchip and HOLMDEL, N Jersey. In Australia was Ray VK3ATN using 150 w input to stacked Rhombics and in New Jersey K3MWA/2 using a kilowatt and a 60-ft. dish. Total earth distance was 10,417 miles, which is believed to be a new 2-metre record. The contact was made between Ray and K6MYC (Stanford University on December 29.

Also over the holiday period Melbourne stations have worked the Brisbane and Rockhampton areas on 2 metres. The stations concerned being VK4ZWB and VK4ZAZ in Queensland and VK3ZNC and VK3ZER in Geelong and VK3ZNJ in Melbourne.

There have been some good openings to VK7, VK5, VK4 and N VK3 on 6 metres but no ZLs and only spasmodic openings to VK6, although the beacon on 53.006 has been heard quite a few times, also the VK6 f.m. net on 52.656 has been heard in Melbourne.

March is the time for the VK3's V.H.F. Group Annual General Meeting and election of office-bearers. So remember the date, Wednesday, March 15, at 8 p.m. 73, Cyril VK3ZCK.

SOUTH AUSTRALIA

Once again the Ross Hull V.H.F Memorial Contest has come and departed, taking with it the remainder of any v.h.f activity that may have been available otherwise. Customarily, perhaps somewhat traditionally, the cessation of the contest spells the end of 6 metres for many months.

The latest contest brought a somewhat dismal picture of activity to VK5. Limited and spasmodic openings to VK1, 2, 3, 4, 6 and 7 was the general rule for the contest. With respect to VK8 and ZL the picture was very bleak and dismal. No VK8s worked whatsoever and only a few ZL openings to maintain interest in that direction. Notwithstanding the ZL t.v. was monitored almost daily and the lack of Amateur signals was most puzzling to say the least.

Nonetheless with the aid of cross-town contacts many high scores were being passed around the bands. Of interest in VK5 was the magnificent tally of 600 contacts plus, recorded by Len 5ZF, a score that started off as a bet with Don 5TM and finished in a determined bid to crack 600, an opportunity afforded on the last day of the contest with a good opening to VK6 Congratulations Len, hope you enjoy those 807s from Don.

On the 2 metre scene it was a matter of frustration for the "old hands" of VK5. To initiate this run of events for the new year on January 1, Brian 5ZBR copied Peter 4ZPL at R5 S8 calling CQ DX, but signals faded before contact was established. The same morning John 5HP at Mount Gambier copied John 4ZWB, however, conditions were against contact being made. However, compensation was afforded when Mick 5ZDR worked 7ZAH at Ulverstone on the 4th January. During this opening quite extensive to VK3 and the S.E. of VK5, Mick almost made it two way to John 3ZDM on 432 Mcs. Although both John and Mick copied each other's signals a contact by definition was not to be made.

On the 7th January Mick 5ZDR managed a contact to 7RL at Mount Barrow near Launceston at 0850 CST, his second VK7.

Perhaps the most antagonising moment befell Col 5RO on January 1 when he copied Rolo 6BO calling DX on c.w. However, despite many frantic answers to Rolo's CQs, Col just could not make himself heard in VK6. At the same time Brian 5ZBR and Barry 5ZMW were doing battle with the VK8 two metre beacon, catching an occasional burst as the signal QSB'd in and out of the noise.

Speaking of beacons, the VK5VF 6 and 2 metre beacons have been receiving favourable reports from near and far, especially on 2 metres. However beneficial to Amateurs outside the VK5 the actual VK5 fraternity obtains no real gain from them apart from converter line-up, etc. With the exception of VK6 no other VK State provides a similar beacon or beacons for the benefit of determining propagation into VK5, instead of out of it. Therefore on behalf of the VK5 V.h.f. Group I would like to appeal to at least one responsible and enthusiastic group to make representation to the Department as a start to furnishing at least one more beacon in VK land. With the possible likelihood of F2 propagation in the near future any beacons whatsoever on the v.h.f bands could only prove beneficial to the Amateurs in that State. Just how many enterprising and rational v.h.f. groups are there in VK outside of VK5? Good question! 73, Colin 5ZHJ.

WESTERN AUSTRALIA

VK6 Beacons. The frequency of VK6VK is 144.196 Mcs./52.006 and 432 Mcs. The beacon is highly regarded by ESops after that elusive VK6 on 144 (there have been only three VK6-VK5 QSO in about 16 years), and bear in mind that from its current QTH it serves as an indicator for the metropolitan area, in distinction to VK5VF—144 Mcs. on Mt. Lofty which, if 52 Mcs. is any guide, has its own private propagation; however, 6ZCN heard it two years ago.

Unfortunately, notice of reports of hearing VK6VF—144 Mcs. from the ES often take a long time to filter back, but they do occur. It is a worthwhile activity to maintain it (and 52 Mcs. and 432 Mcs. for that matter).

Perth News. The main opening to the annual 52 Mcs. DX season in Perth took place on 29th December, 1966, when VK5s and VK3s were worked from 1030 to 2230 W.A.S.T. The season seems to have started later this year than in recent years, though it appears to be lasting longer—last year (1965/66) very little DX work was available after the 1st January. The individual openings have been of about the same duration but the number of signals on the air make it hardly worth while entering for the Ross Hull Contest.

Consistently good signals were heard from 5ZLP, 5ZDX, 5ZDR, 5ZF and 5ZFD, though mostly signals were very poor, with many of the Eastern States boys running between 5 to 30 watts.

144 Mcs. checks to VK5 on a few days during the strongest openings were without reward.

ALBANY AREA DX

December, all times W.A.S.T.

26th: 1700. No Amateurs all day. Ch. Zero Melbourne 50 plus.

28th: 0958-1040 9—VK5, North and City, solid.
1718-1900 2—VK3, 6—VK5, all Mt. Gambier way, good signals.

30th: 1145-1335 12—VK5, 1—VK3; Adelaide and N.E. District of VK3.
1543. Ch. Zero. Melbourne.
1830 ZL T.V., Ch. Zero. Melbourne.

Jan. 2, 0939-1805 Ch. Zero Melb. in and out all day, weak, nothing else.

Jan 3 1508-1718 L5—VK5.
1737 Ch. Zero Melbourne. 50 plus.

(Reprinted from the W.A. V.H.F. Group Bulletin.)

ANTARCTICA

From Rod VK0CR (VK3UG). Owing to circumstances beyond the control of the designers and builders of the 6 metre beacon, it will not be operating until March. The unit has been thoroughly tested and is working satisfactorily. Its frequency is 52.0025, for further information on the beacon please write to Noel Schruhm VK3ZPQ. 73, Rod.

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NEW CALL SIGNS

NOVEMBER, 1966

VK1ZCW—E. Westerman, 29 Charteris Street, Chifley.
VK2BJK—J. G. Kaarsberg, 179 Addison Road, Marrickville.
VK2ZIC—B. P. Carroll, 2/5 Burrawong Avenue, Clifton Gardens. (Licence Revalidated.)
VK2ZLX—R. W. Walker, Station: Flat 7, 431 Gt. North Rd., Abbotsford; Postal: Box 34, Post Office, Pyrmont.
VK3ZB—R. J. Hollis-Bee, 16 May Street, Balwyn.
VK3AIS—R. E. Allengame, The Manse, Mount Street, Wycheproof.
VK3ZMS—J. M. Bywaters, 30 Queen Street, Nhill.
VK3ZQI—L. F. Schmidt, 1 Ward Street, Ashburton.
VK3ZQL—J. A. Blanch, 23 Azalea Crescent, North Dandenong.
VK3ZRR—C. Reisinger, 13 Wardale Road, Noble Park.
VK3ZSK—R. J. Wyllie, 30 Price Street, Essendon.
VK3ZTZ—D. M. Clancy, 221 Burwood Road, [redacted]
VK3ZWM—W. D. Moulton, 18 Akuna Avenue, Nottinghill.
VK3ZXL—M. S. Richards, 11A Clark Street, Reservoir.
VK3ZYM—J. R. Millan, 30 Ashburn Grove, Ashburton.
VK3ZYO—P. S. Collins, 28 Taunton Avenue, South Oakleigh.
VK3ZYR—S. Rayson, 1566 Dandenong Road, Huntingdale.
VK3ZYZ—A. B. Hamilton, 11 Victoria Street, Ringwood East.
VK4ED—E. B. Dearing, Jnr., 8 Kianga Street, Gladstone.
VK4ZUL—J. T. F. Linde, 47 Macalister Street, Park Avenue, Rockhampton.
VK5ZP—J. McL. Vale, Flat 8, 139 Young Street, Parkside.
VK5ZNR—G. J. Simmons, Lot 38, Sylvan Way, Glenalta.
VK5ZTK—T. D. Steinwedel, 17 Amos Way, Seaton.
VK6IB—G. Chisholm, 21 Cygnet Crescent, Dalkeith.
VK6ZGA—L. N. Smith, W.A.M.C. Carmel.
VK7MR—D. A. H. Thorne, 108 Park Street, New Town.
VK7SS—P. R. Tompson, 12 Richardson Avenue, Dynnyrne.
VK7ZHH—H. F. Hutchinson, Station: Savage River; Postal: C/o Bechtel Pacific Corp. Ltd., P.O. Box 579, Burnie.
VK8NO—L. H. Vale, Eldo Tracking Station, Gove.
VK8ZBA—J. A. Cooper, Eldo Tracking Station, Gove.

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VK RESULTS

P.A.C.C. CONTEST 1966

Station	Contacts	Contact Points	Multiplier	Final Score
VK3APJ	12	36	4	144
VK5MQ	3	9	2	18

The 1967 contest will be held over the period 1200 GMT, April 29, to 1800 GMT, April 30. PAVB, the V.E.R.O.N. Contest Manager, asks for greater participation by VK stations in 1967

FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL QSL BUREAU

With reference to paras in these notes in the December issue, regarding QSL facilities in Holland, further information now received from Mr R. Stevens, Vice Chairman of the Region 1 Division of the I.A.R.U., clearly shows that the facilities offered by the I.A.R.U body V.E.R.O.N are superior to those claimed by the splinter group All Amateurs are advised to utilise the V.E.R.O.N., P.O. Box 400, Rotterdam An amalgamation of the two bodies now seems imminent.

Recent visitors to Melbourne included VS6RJ who, under the guidance of Norm VK3NM, visited several stations, and Dennis 5VINZ who called on Wally VK3MJ.

Bill Conklin (K5KA and his XYL (WA6VEJ) plan a short visit to Australia in April. They are due to arrive in Melbourne at 1055 E.S.T. on Thursday, 6th April, and leave for Adelaide 385 E.S.T., Friday, 7th April. During their brief stay they would like to meet old and new friends, particularly Snow Campbell, VK3MR. They may be contacted at the Intercontinental Hotel.

The R.E.F advise the following new address for their QSL Bureau, effective 1st January, 1967. QSL Bureau R.E.F., Boite Postale 70, 75 Paris 13, France.

The A.R.R.L. advise that the QSL Bureau for the 4th call area has been divided to ease a heavy work load. Cards for W4 and K4 calls should continue to be sent to W4AM, Box 12, Chatanooga, Tenn. 37401. Cards for WA4, WB4 and WN4 now go to WA4WIP, Richard Tesar, 2668 Browning St., Sarasota, Florida 33577.

The Israel Amateur Radio Club requests that all cards for Israel should be sent to their QSL Manager at the following address: Shalom Bakalo, 4X4-760, Diyur Amami 16, Herzlia, Israel.

Cards through the Federal Bureau during 1966 constituted an all time record, no fewer than 78,483 being processed.

—Ray Jones, VK3RJ, Manager.

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NEW SOUTH WALES

The N.S.W. Division's Annual Convention took place over the Australia Day week-end (January 27-29) and the President (Tom O'Donnell VK2OD) and his Council are to be congratulated on the overall success of the various functions. Chairman Tom presided over the monthly meeting. During the evening an interesting lecture on video tapes and video tape recorders was delivered by Howard Lilley VK2AYT. Although only a young man, Howard showed that he had acquired a considerable knowledge of his particular field. In addition to a recent trip to the U.S.A. he has recently visited Vietnam and other areas, lecturing to television station personnel on the use of video tape recorders.

The lecture was supplemented by colour slides of various television recording units. Unfortunately, owing to the length of the talk (almost two hours) other slides of Howard's travels had to be left for another time.

The vote of thanks was moved by Syd Moles VK2SQ, who, as an expert himself in television technicalities, paid tribute to Howard for his excellent lecture and the knowledge he had displayed.

The following new members were welcomed into the W.I.A.: Full—A. Deans VK2ZTD, G. B. Hart VK2IML, E. L. Lloyd VK2ZV, Wagga District Radio Club VK2WG, J. G. Kaarsberg VK2BJK Westlakes Radio Club (VK2ATZ, M. Blackstone VK2BQ, Associates—D. Robson, S. Voron, R. Ellis, G. West.

The Federal Councillor, Pearce Healy VK2APQ, submitted his annual report, which was adopted. The report dealt with such matters as the revised edition of the P.M.G. Handbook for the Amateur Service, which should be completed shortly; power limitations of s.s.b. transmitters set at 400 watts p.e.p.; revised dates of A.O.C.P. and L.A.O.C.P. exams, which come into force in August next; the proposed Federal Constitution, some contentious points of which are still outstanding; the apathy of a large number of members to the I.T.U. Fund and the danger of frequency cuts; complimentary reference to the Federal Contest Committee for its excellent service and promptness in having contest results finalised, the Australis I project, the Youth Radio Scheme's progress and the prestige gained by the Institute, as a result of this activity, among governmental and commercial undertakings, Customs duty on Amateur equipment, etc. Pearce concluded his report by thanking Divisional Council and members generally for the support they had given him during the year.

When the chairman called for nominations for the position of Federal Councillor for the ensuing 12 months, Pearce had no opposition and was declared elected.

On the Saturday evening, following predinner "appetisers," about 80 people sat down to the three-course meal. As on the previous occasion, members were encouraged to make this a family gathering, and the presence of so many wives and the resultant social atmosphere indicated that this type of function should continue to be a regular feature of our conventions.

The organiser and master of ceremonies was Bill Lewis VK2YB. Opportunity was taken during the evening to make a presentation of the Adams Trophy to Wal Salmon VK2SA. Prior to the handing over of this handsome trophy by the President, the Education Officer, Harold Burtoft VK2AAH, informed the gathering that this award was made annually to the author of what was considered the best article by a VK2 Amateur appearing in "Amateur Radio." Three articles from VK2 had appeared during 1966, and that by Wal Salmon, "Series Phased Array for 14 Mcs.," had been voted the best by the committee.

In handing over the trophy, the President said that as it was known Wal and Mrs. Salmon would be attending the dinner, news of the award had not been made known, so that it would come as a pleasant surprise to the recipient. Tom extended heartiest congratulations to Wal on behalf of the N.S.W. Division.

The remainder of the evening was spent listening to talks by Harold Burtoft VK2AAH, Bob Black VK2QZ and John Featherstone W6RPL. These talks covered various angles concerning our hobby, or variations on the theme.

After a fairly steady start, Harold meandered off into the realms of fantasy, apparently in search of some elusive signal. Eventually, however, he became so entangled in the web of his own weaving that even at this stage we are not sure if he ever found what he was supposed to be looking for.

Bob Black likewise was knocking on the door of Fantasia with his treatise on the specifications and characteristics of the ideal Ham's wife (purely mythical, I fear). If Bob ever finds this ideal in any number, may we suggest that he advises the Divisional Equipment Store.

As for John Featherstone—well, I've often heard Aussies pulling Yanks' legs with very convincing tales about their huge gumma farms back home, but this is the first time I've heard a Yank turning the tables with a story about his road-runners who, it is said, can spring into the air and then take off horizontally.

The concluding function of the convention, the field day at our transmitter site at Dural, was well supported, there being 98 registrations and a total of 220. Visitors were present from Canberra, Newcastle, Cessnock and Gosford, with possibly others we did not notice.

Councillor Peter Campbell VK2AXJ was chief organiser and he had good support from President Tom O'Donnell and other members of Council. It was pleasing to see such a well-balanced programme, with something of interest for everyone. In addition to the field events for the trophy hunters, there were displays of commercial equipment on which much DX was worked during the day, together with a selection of bits and pieces from the Divisional Equipment Store. The ladies were also well catered for and from the increased attendance of the fair sex it would appear that they are appreciating attempts to make them feel more at home at our functions. As well as the "feats of strength," such as nail-driving, bursting balloons and throwing the rolling-pin, a floral art demonstration was arranged and this was very popular.

The harmonics, too, had plenty to keep them out of mischief, with pony rides, slippery dips and other attractions.

Something new this year was a display of equipment built by members of the Youth Radio Scheme. Although this had been decided on only after the commencement of school holidays when school radio clubs had closed, the response was beyond all expectations and over-taxed the available space. The range of projects brought in by these lads certainly opened the eyes of most adults, and included many ingenious pieces of equipment, ranging from a television set down to simple oscillators. Unfortunately, two of the leading lights in the Y.R.S., Roger and Andrew Davis, of Canberra, had a mishap with their car when only a few miles from Dural, and did not arrive until late in the afternoon.

During the prizegiving the President announced that items of equipment had been received from the following donors, and the VK2 Divisional Council wished to acknowledge these with many thanks. Messrs. Jacoby Mitchell, Ampex, A.W.A., R.C.A., Mullard, Belco Controls, I.R.C., W.F.S. Electronics, Mosman Television Services, Ducon, Ferris, Electronic Parts, Geo. Brown, Pye Crystals, E.M.I. and O. T. Lemprieres.

With the presence of so many young people associated with the Y.R.S., opportunity was taken to present Peter Gross, of Kogarah, a member of Roger Davis' Postal Group, with his prize for gaining 98% in the Elementary Certificate examination. This prize, donated by Overseas Telecommunications Commission, consisted of "Electronics Australia" Basic Radio Course, and it was handed to Peter by the Divisional President, Tom O'Donnell VK2OD.

Over the Christmas holidays, with my family, I had the great pleasure of visiting the stamping ground of my opposite number in VK5, Warwick Parsons VK5PS. Had a short but very pleasant eyeball QSO with him, and in spite of frequent derogatory comments inserted in brackets in the VK5 Divisional notes by "you know who," I found Warwick to be a thorough gentleman. (This should ensure an invitation to dinner next trip!) But then we didn't discuss either editors or black boxes called "Things," so that could have helped. All jokes aside, though, we enjoyed our few days in Adelaide, and would like to compliment our VK5 friend on their beautiful city and the friendliness of everyone we met. (Any opinions expressed in these notes are the author's and not necessarily those of the publishers.—Ed.)

We were very pleased to hear recently that the VK1/VK4 "Famfest," held at Kingscliff, near the border, last November, was even more successful than the first effort in 1965. Stan VK4SA tells that there were 145 people in attendance and a good time was had by all—which augurs well for a continuance of this very worthwhile combined effort.

URUNGA CONVENTION, 1967

Urunga has been the happy meeting place for Hams over a period of many years, and the committee has been busy organising so that this year will be no exception.

Our old mate, Grafton Bill VK2OE, to the uninitiated, has forwarded us a copy of the programme for publication, and a glance at it will show that everyone has been catered for. One innovation this time is the increased prize money for the 144 Mc. hunt on Saturday, 25th March. The lucky winner will receive $40 cash. (What about the Amateur status.—Ed.)

Due to the topographical nature of the Urunga district a 144 Mc. hunt can be interesting and intriguing, with the signals being reflected from the surrounding hills. Forest-covered areas abound, with shady fern glades and rain forests. The great number of roads and tracks give easy access to interesting spots and this, with the sub-tropical climate, should assure ideal conditions for this popular convention. In urging our readers to "be in it" at Urunga this Easter, Bill says that everyone will be made very welcome, as usual.

SILENT KEY

It is with deep regret that we record the passing of:

VK2TY—R. W. Best.

The programme is as follows:

Friday, 24th March. Get-together Ocean View Hotel, Urunga.

Saturday, 25th March 9 a.m. to 10 a.m., Registration ($2.50), 10.30 to 12 noon, 7 Mc. hidden transmitter hunt, 12.30 to 1.30 p.m., lunch, 2 p.m. to 3.30 p.m., 144 Mc hidden transmitter hunt (transmitter will be hidden within 10 miles radius of Urunga—1st prize, $40); 8 p.m., social and supper at Urunga School of Arts.

Sunday, 26th March: 10 a.m. to 12.30 p.m., 144 Mc. hidden transmitter hunt; 1 p.m. to 2 p.m., lunch 2.30 to 4.30 p.m., all-band scramble, 8 p.m., prize-giving, social and 73's at Urunga Bowling Clubhouse.

For the XYLs: Saturday afternoon—pictures at Tasma Theatre, Coff's Harbour, as guest of the management. Sunday, 1.30 to 5 p.m., sightseeing tour of Urunga and Coff's Harbour district by cars. 73, Ivan VK2AIM

OBITUARY

ROBERT W BEST, VK2TY

We regret to say that another gap has occurred in the Amateur ranks with the passing during the month of Robert W Best VK2TY, late of Boronia Park, near Gladesville.

Bob was a transmitter technician with Station 2KY, and collapsed and died while on duty at the early age of 50 years.

Hailing from the Maitland and Newcastle areas, Bob gained his Amateur ticket prior to World War II, and during the war acted as engineer at Station 2HD, Newcastle.

He was active mainly on 7 Mcs., with emphasis on mobile working later in his life. Occasionally he was heard operating on 14 Mcs. s.s.b.

Bob leaves a widow, son and daughter, to whom we offer the sympathy of all members of the Wireless Institute of Australia.

VICTORIA

WESTERN ZONE

Activity in our zone has been quite good, despite holiday time and the busy part of the year for our land-dweller members.

Allan VK3HL works mostly on the DX bands, s.s.b. and c.w. He keeps weekly skeds with W's changing bands to suit conditions during the year.

Harry VK3ZX was present at the W.I.C.E.N. School. He is also active on most of the bands, using his home-brew s.s.b. rig.

Chas. VK3IB has the world at his fingertips with his f.b. Collins set-up.

Herb VK3NN and Garry VK3ZOS work consistently on all bands including v.h.f., a.m., s.s.b. and f.m.

Gavan VK3AEJ at present building his s.s.b. so guess he will be pleased with his set-up when it is finished.

Bert VK3EF, one of the most active on the hook-ups. However, due to his secretarial activities will not be able to spend much time with Ham radio this coming year.

Bob VK3ARM still able to put a good signal on the air when his municipal duties permit him.

Trev VK3ATR heard when he has some spare time. Guess his Cherokee aircraft is also a favourite so think Ham radio suffers a little.

Sorry to lose husband and wife combination from our zone John VK3AFU and Brenda VK3KT have left us to reside in the city. However, they will still come in our hook-ups when they get on air from their new home.

Pleased to hear our ex-member, Merv VK3AFO who is now located in Wodonga. Neil VK3AQD although mostly away during our hook-ups still manages to make contact, using his mobile gear. Harold VK3AX works some rare DX on the bands, using c.w. 73, to all VK3AKW.

AMATEUR FREQUENCIES

ONLY THE STRONG GO ON—SO SHOULD A LOT MORE AMATEURS!

MOORABBIN AND DISTRICT RADIO CLUB

The office-bearers elected at the Annual General Meeting were:—

President: Bill Yates, 3AHS (phone 95-1867).
Vice-President: Bill Sievers, 3CB (24-4154).
Secretary: Harold Hepburn, 3AFQ (96-2414).
Treasurer: Peter Hebard, 3XK (93-2895).
Asst. Sec.: Alan MacLean, 3ZSL (93-6285).
Committee: David Rosenfield, 3ZOP (56-3194); Col Anderson, 3XV (57-1472).

The club meets at Black Rock on the first and third Fridays of each month at 8 p.m. The first Friday is a "Natter Night" with no formal business, and the third Friday is a General Meeting at which business is dealt with swiftly and is usually followed by a discussion on a technical topic.

The January topic was a panadaptor being constructed by Harold 3AFQ, and the February topic a demonstration of R.t.t.y. by Kevin 3ARD.

Club members receive a monthly newsletter "AFC" (the title has nothing to do with headaches—it's the club call sign) in which they are advised of the various meetings, transmitter hunts, disposals nights and social events arranged.

Annual membership costs $2 for seniors and $1 for juniors, and is open to anyone with an interest in radio.

Honorary membership is granted to any licensed Amateur in the world who has a specified number of contacts with club members. Details are available from any of the office-bearers listed above.

Visitors are always welcome at the Moorabbin and District Radio Club—see you there soon? 73, Alan 3ZSL.

— . . . —

QUEENSLAND

TOWNSVILLE AND DISTRICT

Cannot seem to take a trick since I went on annual leave. On my return missed out twice in sending the notes in time to meet the deadline. So my humble apologies to all the chaps who look forward to seeing their names in print, as I try each month to see that at least the VK4 have a small paragraph in "A.R." to show that at least we are still part of the W.I.A. As I am unable to wish you all the best for the festive season, will compromise and wish you all a Happy Easter and that all your mobile rigs keep perking.

While on leave in the far, far west (VK6), took the opportunity to call on Doug 6ZCD to pick up my 50 Mc. QSL card. Also managed to meet a few of the boys in Perth. John 6QU had to provide the transport as usual in his fine driving style. Didn't even land a traffic ticket. Wonder why?

While in Sydney an opportunity was taken of the mateship of Bill 2AJL to meet all the boys of the Norfolk Island net of a Sunday morning. Phyl did dispense tea to all the gang who did come along. Naturally Zoe 4ZW's better half did the honors in Cairns as we came to the end of a long travel by train. I must patronise the railways—that's my bread and butter.

The local A.O.C.P. classes are coming along fine and it appears that around the dozen will eventually face the barrier. Wish them every success. Peter 4LU trying hard to explain the decimal point to Marj, his XYL, as she studies for the ticket. Eddie 4WH going on leave and passing in the job of secretary of the local club which he has guided for many a long year. It will be hard to replace him as this is the most thankless position in any club.

The boys are trying to get a W.I.C.E.N. net going and from what I hear there weren't enough portables available when they were required to help locate a missing youngster. Glad to say they are now being built and tested out. So will be ready for any further emergency. Good on the Z boys—not the Z cars.

Bert 4LB still in strife with the transceiver, while Ted 4EJ does not seem to have as good a signal on his as the old transmitter. Merv 4DV still chasing the elusive D.X.C.C. and slowly getting to the century; has still to get the coveted pieces of cardboard to prove them. Len 4GD still heard plaintively calling from the top of the rock towards east Stateside. 73, Bob 4RW.

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SOUTH AUSTRALIA

The monthly general meeting of the VK5 Division for January was held in the club rooms to a slightly below normal gathering of visitors and members—the slightly below normal applies to the number present, not the members themselves—due probably to the fact that a good number are still away on vacation, or still recovering from being away on vacation. The business for the night, both local and Federal, was speedily disposed of, and to all present it began to look like one of those nights again, when out of the blue the question of the I.T.U. Fund was brought up, and it no longer began to look like one of those nights again. Many and varied were the suggestions brought forward as a means of bringing our $300 shortage to the Fund up to date in as quick a time as possible. The discussion looked like going on until after the I.T.U. Convention had finished, and in deference to our guest speaker, the subject was adjourned until after the lecture which followed the distribution of QSL cards by George 5RX, and the short smoke-oh.

The lecturer for the night was Peter Russell, VK5ZJR, a design engineer in the electrical control section of E.T.S.A., and titled "U.h.f. Radio Communication for Power Utilities," and to say that it was an outstanding success would be to put it mildly. Having the subject at his fingertips, amply illustrated by slides projected on a large screen, to say nothing of a collection of hardware associated with the radio equipment in use, Peter laid them in the aisles, and how. It has often been said that the number of questions, their variety and sensible nature, are a sure indication of the success of a lecture, and this being so, then Peter should be more than pleased with the reaction of his audience, and the mad rush towards the table when he started to display the aforementioned hardware. Gilbert 5GX proposed the vote of thanks in his usual interesting and inimitable manner, and the response by the members present to the vote of thanks must have been music to the ears of Peter. When I left at 10.45 p.m., he was still surrounded by a swarm of interested viewers of the hardware, not one whit dismayed by the distant baying of the Alsatian houndawg, nor by the obvious sounds of the loading of the caretaker's .303. What about the discussion on the I.T.U. which was postponed until after the lecture? Well, what about it? There were too many interesting things on the table to be picked up and commented upon, to bother about trifles!!!

One of the business matters brought up early in the meeting was the reading of the reply from VK2 to the letter sent to them by Geoff 5TY concerning the Federal Constitution, or should I say the proposed Federal Constitution. After hearing the reply, and noting Geoff's reaction, I think his next move will be to try knocking his head against a brick wall—not that it will help much, but I understand it feels so nice when one stops!

I also heard that the doyen of the s.s.b'ers, Phil 5NN, had to rise from his couch of virtue at the unheard of hour of 3 a.m. for the purpose of clearing a choked gutter, with the rain coming down like a couple of product detectors in push-pull parallel. In view of the fact that Phil claimed he had cleaned the said gutter about two weeks ago, plus having a nasty cold, he was by no means amused, but I cannot understand why he was heard later on to say that because of the cold he could not get on the air. After all I have often heard it said that a cold is not necessary for good "luck talk," but it helps!!

Have not mentioned Launce 5LD much in these notes lately, in fact to be accurate, not for quite a long time, but I can quite understand the reason now. Having a browse around the bands at 0415 the other morning, there he was dah-dit-dahing to his hearts content. No wonder I can never get any news about him—blime, at that hour. Anyway he soon had a mate, Johnny 5KO got into the act a little bit later, so apparently this early hour has its attractions. What's that? What about me being up at that hour? Well, at least I get paid for it!

Jim 5YK called into my QTH for his annual Father Christmas act with my grandson, and he was certainly looking in the pink. It appears that he has at last shaken off all of the wogs, but I write this with my fingers crossed, because a couple of my spies who are in the habit of frequenting a certain doctor's surgery, reported to me that both he and his XYL were seen recently having a free read of the magazine in the said surgery—I wonder—No, it wouldn't be that!!

Not much being heard of Len 5ZF these days. Probably due to Ross Hull activity on the v.h.f's, but he must have found some time to spare to do some clearing up, because one of my 006 and a half boys reports that he has been offering a lot of items at bargain rates. Sounds like an opposition disposals committee.

Most people do their best to take it quietly over the Xmas season, but not our grumpy old Federal Councillor, Geoff 5TY, who became the victim of the well known "Murphy's Law" because (1) there was a certain water pipe to be attended to on Xmas Day, a burst and a half I believe; (2) his XYL went sick, probably found the cookie jar I have been referring to lately, and (3) one of his harmonics sustained a broken arm. However, the ray of sunshine eventually appeared when he learned that he had been rewarded for all his studies during the year by a pass, which will entitle him to do some more study during 1967, thus helping him to dispose of some of his well known spare time. Quiet, quiet, there are some juvenile readers about!

Passing the domicile (QTH to you) of Bob 5ZDX recently and could not but notice the construction works on the opposite side of the road. It has been freely rumoured that it is a new shack for Bob, but I would have to have further proof of that before I alluded to it in these notes, which after all have a solid reputation for their veracity and conciseness, especially in VK4 and VK6.

Arch 5XK back from Lord Howe Island and reporting a good trip. He is especially voluble about how the "dog pile" was kept in order by certain W stations, and said that it was a pleasant surprise to hear what went on to facilitate the DX stations working him. The main offenders appeared to be the JA and U stations, and he also commented on the fact of it being no use trying to work on 3.5 or 7 Mc., and he mainly concentrated on 14 Mc. He sneeringly commented on the fact of not having heard me at all, although I offered to bring proof of my having called him several times from the front lawn on my flute, or was it an oboe? Never mind, he would not have answered me even if I had called him on s.s.b.—What am I saying, let's hope that I never sink that low!!

Sorry to note that my old sparring partner Ken 1KM has thrown in the towel owing to pressure of business—not monkey business, I hope. He has been handling the Youth Radio column for some years now, and we tangled early in the piece, and have continued to tangle ever since. All the best Ken, for the future, thanks for keeping the feud alive all these years, and what a typical VK1 final punching—fixing it for a YL to take your place—no offence, Mona 2AK8, but I have never hit a woman in my life—punch them, yes—but never hit them—quite a cunning move, Ken!

Les 5NJ and the family have been spending the opening of the new year at Stansbury caravan park, almost at the water's edge. He took his portable "thing," also his 10 watt "ancient and modern," and teaming up with an old friend of his Harper, 5NV, who has a shack in that area and is a sailing enthusiast with a 20-foot catarmaran, they both gaily catamaranned up and down the gulf, eventually reaching Port Vincent, feeling something akin to Columbus when he discovered America. Not the least of the equipment carried was a Type A-Mk. 3, stowed on the port side, with which they contacted 5NG/P at Sunnyside on the River Murray, and 5QX at Port Broughton.

Understand that there was a query recently as to who took over the high sounding job of Custodian of the Instruments, recently vacated by me. On being informed that the new Custodian was Jim 5FO, the enquirer then asked what had become of the Custodian's uniform of which I have often boasted, and if it had been handed over with the office, adding, with a certain amount of corroseness that it had been handed over, it certainly would not have fitted Jim, owing to the structural difference. As a matter of fact it had so many badges and medals on it that it used to make me bandy when I wore it, so I never handed it over to Jim, mainly because I felt that his XYL Rae would not want a bandy husband—and same to you Rae.

Had a chat to Len 5YF the other day, an old-timer if ever there was one, and during the conversation he hinted that he might be making a comeback, probably on s.s.b. I will save his feelings by saying that I don't think he realised just how hard he was twisting the knife in the wound as he merrily went on his way expounding the benefits and efficiency of this system to me. Sounded to me as if he had spent about 15 seconds listening to a certain gentleman from Gawler. Anyway Len, we will be pleased to welcome you back any time on the air using any system.

During the rather long period of my being the VK5 scribe for the magazine I have had a shot at various individuals in various Divisions, and at times when I felt in a somewhat devilish mood I even had the temerity to have a shot at a Division or two. The results have been at times very rewarding, but never have I been able to get even a flicker of an eyelid from VK7, presumably I am not read in that Division. My only success was with Greg., a well-known VK7 writer to the magazine, to say nothing of being a dabbler in quite a number of Divisional activities, and what looked like becoming a beautiful friendship was abruptly terminated last month when I read an article concerning a 5 watts s.s.b. rig, under his name

and with suitable comment on its probable effect on me. If he will write this way without a ticket, what will he write when he gets one? As a punishment, I will not mention his name for the next six issues. See if I care!

Working on the assumption that this is a free country and if one wants to "grizzle," then one is permitted to grizzle, then I suppose it is only logical that it works in reverse, and if one wants to praise then one is permitted to praise. Therefore, a big pat on the back to all those associated with the new 1965-7 Call Book for its overall excellence and modern look, to say nothing of the information contained within its cover. I know —I know—"Crawling"—but credit where credit is due, and it does make another paragraph —ahem!

Noticed Doug 5KK at the meeting. Apparently he has become used to the red traffic lights and the dangers of the big city, because when I met him about a month ago he gave every indication of heading back to Alice Springs at the double, he seemed to think that it was too hectic down here.

Struck a fellow this week who used to be always at the general meetings, and on his day was first among the helpers for the Division when needed. When queried as to his absence from the meetings these days he made some quite transparent excuse, and seemed to be somewhat embarrassed. Now me being what I am, we soon got down to tintacks, and he admitted that he was not getting any younger, and had been having somewhat of a bad trot, and his absence from the Divisional scene was mainly financial. I was quite upset about this, because for years and years the VK5 Division, and other Divisions for all I know, have made special provision for such happenings, and all it requires is a letter to the Secretary explaining the circumstances, and the Division is more than glad to carry the member until things come good, no matter for how long. Don't let any false pride stop you if things are not so good, the whole thing is confidential, and after all, if you have been good to the Division in the past, why shouldn't we be good to you in the future. Don't hesitate for a moment, in fact, I think I will try them out myself. I am having a bit of a bad trot, I am down to my last million—oh, the things I say for a laugh!!

While I am on the subject, any member who is called up for National Service is entitled to an adjustment on his subscriptions. So go to it.

Bill 5WW was noticed at the meeting, still looking his young and jovial self—no kidding, Bill—you don't look any different from 20 years ago—you notice I don't say anything about how you feel as to 20 years ago!

Marshall Hider was also at the meeting and seemed a little bit more enthusiastic as to the results of the last exam, although he still has only harsh words to say about the code. Anyway, keep pegging away Marshall, remember Alfred and the seashore, or was it Canute and the cakes, or possibly Bruce and the bells of London—no wait a minute, I've got it—it was Whittington and the spider.

The editor of the VK5 Journal, Brian 5CA, in referring to my little trip to the horse-pistol, said that I was now O.K. again—I quote —"Warwick wishes his many friends AND OTHERS a merry Xmas, etc., etc." I have since been inundated with enquiries from a surprising number of members as to just what category they come under—friends or others. I have been cut to the quick at such a suggestion, I thought I was the friend of everybody, even VK4 and VK6—yes, and if you want to go the whole hog—even of Pincott 3AFJ, although I will be the first to admit that this is stretching my friendship a bit!

73 de 5PS—PanSy to you.

WESTERN AUSTRALIA

Hello again! Well, here it is Convention time again, and there are sure to be some curly ones on the agenda. Good luck to all Federal Councillors as they set about their unenviable task.

"State on the Move," that's VK6 all right. Firstly, Graham 6ZDB shot through to VK3 for a couple of years' duty. Hope all goes well for you O.M.

Then Doc 6AQ flew the coop—also to VK3. I suspect, but cannot prove that the VK3 mob found out what a first-class lecturer and research man Doc is, and pulled a fast one on us!

On the credit side of the ledger, VK6 has gained a member at the expense of VK5. Bro. John Griffin, ex-VK5VG, is now domiciled at Geraldton. Welcome back to the sunny West Griff.

A hearty welcome is also extended to Cliff Waterman, ex-G3NKX, now residing in Perth.

News to hand that John 6NJ has bundled his worldly possessions together and changed QTH to Binnu. "Where's Binnu?" you ask, as well you may. I have been informed on good authority that it is north of Northampton. John has only one small problem, as far as Ham radio is concerned. How does one operate 60 watts of a.m. from bottled gas? I can foresee some hasty research being conducted into the construction and operation of solar cells. However, a word to the wise, keep an eye on your power mower, he may be on the look out for some such small petrol engine.

Russ 6LY, now that's a rare call these days, recently visited the Radio Centre of the South West. Quiet you Bunbury guys, I'm talking about Waroona! I believe that John 6EZ also sought refuge at this quiet spot. Come to think of it, so did I.

Lionel 6LM was operating portable recently while holidaying at Albany. Keeping an eye and an ear on 6 metres too, hoping for a breakthrough to our eastern neighbours.

A couple of the boys who keep the "one-eyed monster" goggling up Mawson way. Tom 6TR and Brian 6VV have been making their presence felt on 80 metres. At present using a 122, although it is rumoured that the drawing instruments have been carefully dusted and sideband is not far away.

Len 6LG not quite as active on the bands lately, but I know from experience that lawns take a lot of looking after this weather, and Len sure has plenty of lawn. He is also doing more than his share to keep Ham radio alive by numerous c.w. practice sessions with chaps interested in attaining their "full" ticket.

While on the subject of new calls, congratulations to Bob Trapp VK6BT and Glenn Ogg (still awaiting a call sign), just to name a couple. There are bound to be others, too, so congrats all round and welcome to the bands.

It was interesting to hear the dulcet tones of Mac 6MM, taped for a recent news broadcast. Mac, you will remember, is at present in the United States, and his impression of band conditions and activities was very enlightening. Particularly that crack about 6 metres, "At first I thought the antenna must have fallen off, it was just like home." Ho hum!!

Sorry to hear that PanSy has been on the sick list, hope all is well with him again and he is soon fit to do battle with "the thing."

One of my "reporters" (he's too old to be a spy) tells me that Clarrie 6CP is a bit like the fiddler's elbow. As far as health is concerned he is up and down! However, it wouldn't surprise me to hear a lusty CQ from him any time now. Cheers O.M.

You've all seen mini-skirts (wow), well the latest craze is Mini Quads—What next, Mini-operators? Who said that?

On the social round during January was the much awaited visit of the Swedish training vessel Alvsnabben on board which were two Hams, Hans SM6CVX and Rolf SM6BRV. They were soon made welcome by Dave 6WT who was on hand to greet them and introduce them to local operators, among whom were Ron 6RS, Jim 6RU, Jack 6TX, Bill 6BA and Neil 6ZDX. The visitors were taken on a visit to Yanchep, to see some real Aussie wildlife. The koala bears were co-operative and photo-whatsisname, but the 'roos and emus couldn't have cared less. These last two breeds are no doubt still a bit down in the mouth about being displaced from the back of our coins.

Ham radio is contributing to our changing skyline. Bill 6BA, on one of his infrequent appearances on 80 metres admitted that he has a commercial beam for triband operation. Add to this the fact that Dave 6WT solemnly promised that, weather permitting, a home-brew beam would grace the top of his tower. Lou 6LU has also threatened to take the necessary steps to elevate a phased array for operation on 15 metres. Kerry 6CA has fitted action to words and has beams atop of his tower, too. He also tells me that a number of his "Friends" are sitting on the fence waiting for him to make the first move in producing some workable mobile gear on 10 metres. Anyone else interested in 10 m. mobile work? Regular travellers through North Perth will have noted the disappearance of a certain antenna which may even now be re-erected at Cyril's new QTH in Applecross.

Well, it looks as though Vic 6VK can chalk up another first in VK6 land. Vic and Harry 6HP have been pioneering the field in RTTY (in VK6), radio teletype to you, bub! No doubt the quick brown fox will get a bit of jumping practice while the boys regain some of their former skill at the keyboard!

Best 73's to all, Ross VK6DA.

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EIMAC DIVISION

385W PEP high gain radial beam tetrode for SSB operation

EIMAC's 4CX350A is a power tetrode having more than twice the transconductance of the well-known 4CX250B and its use in new equipment can eliminate a driver amplifier stage in practical circuit design.

The 4CX350A is designed for linear amplifier service and is normally operated with zero grid current and grid dissipation is limited to zero Watts.

This tube is just one from EIMAC's comprehensive range of transmitting tubes for SSB, DSB and CW applications, with plate dissipations ranging from 65W to 250kW

For further information please contact the Senior Marketing Engineer, Electron Tube and Device Group, at the address shown below.

TYPICAL OPERATION (peak envelope conditions)

DC plate voltage	1000	1500	2200	V
DC screen voltage	400	400	400	V
DC grid voltage	−27	−27	−27	V
Zero signal DC plate current	100	100	100	mA
Peak RF grid voltage	21	21	25	V
DC plate current	260	265	290	mA
DC screen current	−4	−5	−3	mA
Plate input power	260	400	630	W
Plate output power	95	200	385	W
Two tone average DC plate current	210	215	195	mA
Load impedance	1300	2500	3900	Ω

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